On Argumentation Schemes and the Natural Classification of Arguments

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Abstract. We develop conceptions of arguments and of argument types that will, by serving as the basis for developing a natural classification of arguments, benefit work in artificial intelligence. Focusing only on arguments construed as the semantic entities that are the outcome of processes of reasoning, we outline and clarify our view that an argument is a proposition that represents a fact that both conveys some other fact and does so wholly. Further, we outline our view that, with respect to arguments that are propositions, (roughly) two arguments are of the same type if and only if they represent the same relation of conveyance and do so in the same way. We then argue for our conceptions of arguments and argument types, and compare them to prominent alternatives to these. We also illustrate the need for, and some of the strengths of, our approach to classifying arguments through a critical examination of two prominent and recent attempts to classify arguments using argumentation schemes, namely those of M. Kienpointner and D. Walton. Finally, we clarify how our conception of arguments and of argument types can assist in developing an exhaustive classification of arguments.

1. Introduction

It has become clear that stereotypical forms of argument found in natural discourse may have an important role to play in several areas of artificial intelligence (AI).[1] The rich diversity of these argument types or schemes therefore needs to be tamed and ordered to provide a basis that is not only sufficiently formal and well-defined to be employed in AI system building, but is at the same time sufficiently rich and diverse to support the flexibility and breadth that makes the schemes attractive to AI in the first place. Our aim here is to begin this process of taming and ordering by outlining a suitable grounding upon which a classification of arguments can be developed. This grounding needs in the first instance to abstract away from contextual and pragmatic factors, thus facilitating subsequent formalisation within AI implementations, without precluding the construction of further machinery to handle contextual features. The focus is, then, on classifying arguments according to their own natures or intrinsic properties, that is to say on developing a natural classification of arguments.[2]

We begin by discussing alternative ways of classifying arguments and how to decide between them. We make the decision on pragmatic grounds and opt for a natural classification of arguments. In turn, we argue, aiming at a natural classification of arguments requires that we develop an informative understanding of what arguments are and of when two arguments are of the same type. Focusing on arguments conceived of as semantic entities, we proceed to outline and clarify such a view of arguments, along with a corresponding view of when two arguments are of the same type. These views

are then justified, partly through an examination of their usefulness and explanatory strength. So too, prominent alternatives to our conceptions of arguments and of argument types are examined on the same grounds. The need for, and some of the strengths of, our classification of arguments are then further illustrated by examining M. Kienpointner and D. Walton's recent attempts to classify arguments using argumentation schemes. Finally, we briefly discuss how our conception of arguments and of argument types can assist in developing an exhaustive classification of arguments.

2. How Should Arguments be Classified?

Kienpointner distinguishes between two types of argument classification: field-dependent classification and semantic classification (1992, p. 178). Field-dependent classification classifies arguments according to the institutional or situational contexts in which they occur. Semantic classification classifies arguments according to the semantic properties of premises and conclusions. Kienpointner goes on to reject field dependent classifications for two reasons (1992, p. 178). First, he claims that the number of argument classifications would 'explode' if we were to consider very specific contexts of argumentation. Second, he claims that many arguments occur in similar forms in different fields of argumentation and thus that field-dependent classification would yield numerous redundancies and repetitions.

However, while we go along with Kienpointner in rejecting field-dependent classification, his reasons for doing so are problematic. We accept that, if we consider

very specific contexts of argumentation, the number of argument classifications would explode. Moreover, we take it, this would be undesirable as an overly complex system of classification is likely to be difficult to use. Even so, a field-dependent classification might be appropriate. After all, one could be committed to such a classification without having to suppose that all institutional or situational contexts of argumentation need to be considered in classifying arguments.

Kienpointner's second worry also fails. It suggests that arguments from different fields but with similar or identical forms would, on a field-dependent classification, have to be classified as different, thus leading to repetition and redundancy. However, this merely begs the question against field dependent classification. Classifying arguments with the same form as different is redundant or repetitious only if form alone is relevant to such a classification. In any case, since not all argument fields need be supposed considered in classifying arguments, field-dependent classification is compatible with the supposition that arguments from different fields are classified in the same way.

It is, it should be noted, fortunate that Kienpointner's worries about field-dependent classification can be dealt with since the very same worries plague semantic classification. To begin with, there are at least as many semantic properties as there are premises, conclusions and inferential relations, and arguments acquire these properties by having premises conclusions and inferential relations as constituents. Thus, if all the semantic properties of arguments were relevant to their classification, there would be an explosion in the number of argument classifications. Once again, however, those who

support the idea of a semantic classification of arguments need not accept that every semantic property is relevant to classifying arguments.

Furthermore, it might be thought that a semantic classification of arguments leads to repetition and redundancy. Will there not, after all, be arguments that have similar forms but which will have to be classified as belonging to different classes of argument because they differ in some of their semantic properties? Not necessarily. Specifically, this will not be so if only some semantic properties are relevant to argument classification, and if the arguments in question only differ in properties that are not relevant to such classification.

As yet, we have no reason to prefer either a semantic or a field-dependent approach to argument classification. In addition, we can conclude that, irrespective of whether we prefer a semantic or a field-dependent approach, merely stating this preference leaves us a long way from a full understanding of what a good classification of arguments would consist in. We would need, at least, also to determine which semantic properties or fields are relevant to classifying arguments.

How, then, are we to decide which way of classifying arguments is appropriate? As noted in the introduction, a natural classification of arguments, that is to say a classification of arguments according to types or intrinsic properties, would be useful for work in AI. For pragmatic reasons, then, our aim is to work towards such a classification.

There are, of course, other correct ways of classifying arguments. One may, for example, classify arguments in accordance with what John mentioned. Assume that

John mentioned three arguments. In light of this, we may correctly classify arguments into those that John mentioned and those that he did not mention. But such a classification contains no information about what arguments themselves are. And if one is interested in what arguments are such a non-natural (but true) classification is of no assistance.

Specifying that we are interested in a natural classification of arguments suffices to reject field-dependent classifications of arguments. This is so since the use of the very same arguments, and thus of the same entities with the same intrinsic properties, in a wide variety of fields suggests that argument type is not field-dependent. At the same time, it does not uniquely determine the type of classification of arguments we are interested in. There are, after all, a variety of concepts of argument, each of which correctly applies to a different type of entity. Most notably, there is that notion of argument according to which arguments are essentially disagreements or quarrels. Thus, M. Gilbert defines an argument as "any disagreement-from the most polite discussion to the loudest brawl" (1979, p. 3). If by 'argument' we mean quarrel, then some of the intrinsic properties of arguments will not be semantic properties, and a purely semantic classification of arguments would be insufficient.

In the present context, however, we will use the term 'argument' in that sense according to which an argument is the product of a process of reasoning.[3] Thus, in referring to arguments, we are referring to entities of which all the intrinsic properties are semantic properties. A natural classification of such entities can only appeal to semantic properties.

Our reason for focusing on purely semantic entities is also pragmatic. Arguments, conceived of as semantic entities, seem to be constituents in all, or almost all, entities that are referred to using the term 'argument'. It follows that classifying and modelling those purely semantic entities that are arguments is required before we will be able to deal with entities such as quarrels, and thus as we aim to harness the power of argumentation in AI we must begin by getting to grips with those semantic entities that are arguments.

3. Arguments, Argument Types and Relations of Conveyance

Since our aim is a natural classification of arguments, we need to determine what arguments are. In doing so, merely stating, as we have, that their intrinsic properties are semantic properties does not suffice. We need further to determine which semantic properties constitute arguments. Moreover, as we have seen, we need a criterion for determining which semantic properties of arguments play a role in constituting argument types. Thus, we need an informative or substantive conception of arguments, that is to say a conception that does not merely give us a nominal definition of the sense of 'argument' that we are interested in but rather explicates it in a way that assists in developing a powerful classification of everyday arguments according to type. A conception of argument will do this if it suggests a criterion for determining when two arguments are of the same type. We turn, then, to laying out our assumptions about the nature of arguments and about when two arguments are of the same type.

We will begin by addressing the question, "What is an argument?" while keeping in mind that 'argument' here picks out a certain class of purely semantic entities that are the outcome of the process of reasoning. On the conception of argument we are working with, then, the constituents of arguments are taken to include propositions, that is to say the contents of intentional attitudes. Intuitively, questions and imperatives are sometimes also among the constituents of arguments, but for reasons of simplicity we focus solely upon propositions.

As understood by us, an argument is not only constituted by propositions but is itself a type of proposition. This is plausible since any argument can itself be referred to with an appropriate 'that' clause, and thus be the content of an intentional attitude. For any argument, R, we can refer to it as the argument that R.[4]

Of course, those propositions that are arguments need not be expressed in a form that shows that they are propositions. For example, they can be expressed using the form 'P. Therefore Q' or as diagrams, or as profiles of dialogue.[5] Thus, the fact that arguments are often not expressed in forms that make explicit that they are propositions is not, in itself, a problem for the view that they are propositions. Rather, it merely reflects the fact that we typically use arguments to draw a conclusion, or to show how a conclusion is drawn, and that their being propositions need not be made explicit in doing so.

What type of proposition is an argument? A proposition is an argument if and only if it consists (just) in a representation of one fact as conveying some other fact and as wholly doing so. We will say that one fact conveys another if and only if, in the

circumstances, it necessitates or makes liable the obtaining of the other. We will say that a fact wholly conveys another if and only if all of its constituent facts play a part in conveying the other. As to facts themselves, they are simply identified with what true propositions represent.[6]

The idea that one fact conveys another has been explicated in terms 'necessitating' and 'making liable'. In order to get to grips with these terms note, to begin with, that if, in circumstances *C*, fact *A* necessitates fact *B*, then, in circumstances *C*, *A*'s obtaining is not possible without *B*'s obtaining. So too, it is implied that facts of the same type as *A* will, in similar circumstances, necessitate, and so invariably be accompanied by, facts of the same type as *B*. As to the term 'making liable', note that, if, in circumstances *C*, fact *A* makes fact *B* liable, then, in circumstances *C*, *A*'s obtaining makes *B*'s obtaining likely.[7]

When one fact conveys another it does so via the obtaining of some relation of conveyance between itself and the fact it conveys, or via the obtaining of some relation of conveyance between its constituents and the constituents of the fact it conveys. A relation of conveyance is thus any relation in virtue of which, in the appropriate circumstances, one fact necessitates or makes it liable that another will obtain. Relations of conveyance include, among others, fact *x*'s causing fact *y*, particular *x*'s being a member of class *y*, particular *x*'s being a species of the genus *y* and fact *x's* constituting fact *y*. On our view, then, each of these relations can be used in constructing arguments.

Consider, by way of illustration, a case in which the causal relation is operative. In the circumstances, the fact that the US military attacked Iraq caused the fall of

Saddam's regime. Thus, in the circumstances, and via or in virtue of the obtaining of a causal relation, the fact that the US military attacked Iraq necessitated, or made it liable that, Saddam's regime fell. Further, given our explication of 'necessitates' and 'makes liable', this means that, in the circumstances, and via the obtaining of a causal relation, the fact that actions of the US military made the survival of Saddam's regime impossible, or, if one allows that causation is not deterministic, made the destruction of Saddam's regime likely.

Using the causal relation and the above statements about Saddam's regime, we can construct the following simple argument:

(1) Saddam's regime fell, because the US military attacked Iraq and if the US military were to attack Iraq, Saddam's regime would fall.

In (1), the fact that the US military attacked Iraq is represented as conveying, via the causal relation, the fact that Saddam's regime fell. That the relation of conveyance represented is the causal relation is implicit in the subjunctive conditional 'if the US military were to attack Iraq, Saddam's regime would fall.'

We will further illustrate out conception of arguments in the next section. Let us, however, now turn to our view of what constitutes an argument type. What we need is a criterion of identity for argument types, that is to say a criterion for determining when different arguments are of the same type. Our suggestion about what an argument is will help here. An argument, we have suggested, is a representation of a fact as conveying some other fact and as doing so wholly. Now, it is further suggested, different arguments are of the same type if and only if (a) the relation of conveyance they

represent is the same relation of conveyance, and (b) the relation of conveyance they represent is represented as ordering the argument's conveying and conveyed facts in the same way.

Returning to example (1) should help to clarify our view of what constitutes an argument type. In (1) the relation of conveyance represented is the causal relation. Thus, (1) can be correctly classified as a causal argument. However, this classification is only partial as (1) is a certain type of causal argument. (1) not only represents a certain relation of conveyance but represents it as ordering certain facts so that one is the conveying fact and the other is the conveyed fact. Specifically, the cause is represented as the conveying fact and the effect is represented as the conveyed fact. On our view, then, the argument is not only a causal argument, but a causal argument that proceeds from cause to effect. We will call such arguments, arguments from cause to effect.

Taking the way in which relations of conveyance are represented as ordering facts into consideration is necessary as they may be represented as ordering facts in different ways. Thus, just as there are arguments that proceed from cause to effect, there are also arguments that proceed from effect to cause. Consider the following argument:

> (2) A massive force attacked Iraq, because Saddam's regime fell and if Suddam's regime were to fall, a massive force would have attacked it.

The relation of conveyance represented by both (1) and (2) is the causal relation. Yet, on our view, they are different types of argument because they represent the causal relation as ordering facts in different ways. In (2), unlike in (1), it is the effect that is represented as conveying the cause.

Notice that we have now answered the question of which semantic properties of an argument are relevant to determining its type. Only those semantic properties that determine which relation of conveyance an argument represents, and how that relation is represented, determine which type of argument it is.

4. A Sample Argument

Let us offer an analysis of an argument taken from Outlook India in order to further illustrate our conceptions of arguments and argument types:

> (3) It's the old Orissa drought and starvation story being played out again. This time in Rajasthan. Even as the casualties mount, the state and central governments would like the world to believe that the deaths were caused by disease and lack of hygiene rather than by abject poverty and starvation. But for anyone who visits Rajasthan's Baran district, the apathy of the district administration and the failure of the Public Distribution System (pds) is clear to see. Whatever spin you give it, it is hunger that is claiming its victims [Outlook India, "Grass is For Cows", by Bhavdeep Kang, 04 November 2002].

In (3), Kang is contrasting the Indian government's claim that the causes of the deaths in Baran were disease and lack of hygiene with his own views, and, further, he is not merely asserting this contrast but arguing for it. The conclusion of Kang's argument is (a), 'it is hunger that is claiming its victims', and the explicit premise of the argument is, (b) 'the district administration is apathetic and the Public Distribution system has failed'. The link between (a) and (b) is not explicit in (3). The argument nevertheless makes an implicit claim to the effect that, in the circumstances, if (b) is the case, then (a) is the case. It is thus asserting the existence of a specific relation of conveyance between

(a) and (b). Given our background knowledge, including our grasp of the nature of the facts described in (a) and (b), we can see that the relation in question involves some kind of causal dependence. Supposedly, the fact described by (a) is, in the circumstances, an effect of that described by (b). Thus, we can assume that the connective 'then' in the missing premise 'if (b) is the case, then (a)' asserts some kind of causal dependence of what (a) describes on what (b) describes. Moreover, the argument can be classified as an argument from cause to effect.

It is, of course, possible to analyse Kang's argument in other ways. For present purposes, however, suffice it that ours is one plausible way of doing so and that it assists in illustrating our conception of arguments and argument types.

5. Arguments About the Nature of Arguments

The above concludes the outline of our views about what arguments and argument types are. We now turn to bolstering these views. In this section, we intend to do so by contrasting a popular conception of arguments with ours both in respect to adequacy in accounting for what arguments are and in respect to usefulness in generating a classification of arguments.

A common view of arguments, one that shares our present concern with the products of reasoning processes and thus which seems to be in competition with ours, is roughly that (a) an argument is a set or a sequence of propositions that are claimed to be ordered by relations of implication in such a way that, with two exceptions, each proposition is implied by a proposition and implies some proposition. The two

exceptions are a proposition that is not claimed to be implied by any other but that supposedly implies another, and a proposition that is claimed to be implied by some proposition other than itself but that supposedly implies no other.[8]

However, (a) is problematic in a number of ways. To begin with, consider our claim that arguments are propositions. This claim is not entirely new. Nevertheless, (a) identifies arguments with sets or sequences and propositions cannot plausibly be identified with either of these.[9] Thus, our view acquires an advantage in that it is, while (a) is not, compatible with mundane facts such as the fact that any argument, R, can be expressed as the argument that R.

Moreover, whether propositions and relations of implication constitute an argument does not depend on whether the propositions expressed have actually been claimed to follow one from another. For one thing, something can be an argument without its being claimed that the propositions that make it up follow one from the other. This is seen in that something can be an argument and yet only recognised as such after a while. It suffices, then, that there are appropriate relations of implication between the propositions that constitute arguments. That the inferential relation is recognised and that an actual inference is drawn (that a speaker or audience recognises that something follows from something) is, like other parts of the process of argumentation, not intrinsic to arguments.

Similarly, saying or taking certain propositions to follow one from another is not sufficient for something to be an argument. What is taken to be an argument may, for example, be more than one thing. For if it is said that one proposition supports another

when it does not do so, no relation of implication exists between the propositions in question. Thus, one is left with two as yet unrelated propositions, and thus with no argument.

Here again, our view has an advantage over (a). It implies the independence of what arguments are from which relations of implication they are supposed to contain. On our view, it suffices that there is a proposition and that it represents an appropriate relation between facts for there to be an argument. Nobody need say or recognise that this is so. So too, on our view, it does not suffice that certain propositions are taken to follow one from another for them to constitute an argument. Rather, it is required that the propositions in question actually constitute a third proposition, one that represents an appropriate relation of conveyance.

It might, however, be thought that the infelicities in (a) can be removed without much difficulty. Specifically, we can easily remove the references that (a) makes to relations of implication that are *taken* to obtain. We can claim that (b) an argument is a compound proposition that is constituted by propositions that are such that, with two exceptions, each is inferentially related to two of the others, one that follows from it and one that it follows from. With respect to the two exceptions, each of them is supposed only to be inferentially related to one of the other propositions. If there are only two propositions, then both are supposed to be exceptions.

But (b) also fails as it is not an *explication* of the term 'argument'. This is so since saying that one proposition follows from another is no more informative than saying that one proposition bears the kind of relation to another whereby an argument is

constituted. As a result, (b) is not useful for our purposes. In particular, it does not help us to get a better grip on which of the semantic properties of arguments are relevant to argument type and thus on how arguments are to be classified. By contrast, our view is informative. It explicates the notion of an argument in terms of the notions of propositions and relations of conveyance, and our understanding of these notions is independent of our understanding of what arguments are. Moreover, in doing this, it suggests a way of determining argument type, and thus indicates which of the intrinsic properties of arguments are relevant to their classification.


6. Arguments About Argument Individuation

Our view of arguments has the additional virtue of giving us an improved understanding of the identity conditions of arguments, that is to say of when two arguments are the same argument. Copi suggests that two arguments are the same if they have the same conclusions (1990, pp. 19-20). However, as M. J. Wreen observes, there are many counterexamples to this view (1998). For example, there is surely more than one argument for the existence of God. Wreen himself suggests that we individuate arguments by relations of implication.[10] However, it is implausible to maintain that all arguments contain only one relation of implication. Intuitively, for example, most arguments for the existence of God contain more than a single relation of implication. Wreen is aware of this last intuition, but nevertheless rejects it. He argues that if arguments contained more than a single relation of implication and each gave a different amount of support to its conclusion, we could not evaluate the strength of the overall

argument (1998, p. 887). In such cases it would, on his view, make no sense to say of the overall argument that it was good or bad. This, however, seems intuitively troublesome. Wreen's claim covers cases in which premises support a single conclusion merely through separate relations of implication, that is to say cases in which premises operate independently of each other. It also covers cases in which the conclusion of one relation of implication is used as a premise for a second relation of implication. But while it has some plausibility where different relations of implication separately support a single conclusion, it has none when it comes to a relation of implication with a conclusion that is the premise for another. In such cases, for example, we can often reject an overall argument as poor because while one of the relations of implication it contains offers strong support for the conclusion it leads to, the *crucial* relation of implication is, at best, weak.

We must thus build afresh on our propositional approach to arguments. Since arguments are propositions, their identity conditions are those of propositions. This allows us to deal with the problems that the positions of Copi and Wreen face. It allows different arguments for the same conclusion since different propositions can contain the same conclusions. It also allows arguments that contain more than a single inference. At the same time, it does not allow arguments in which different premises support one conclusion, but merely do so separately. For example, in
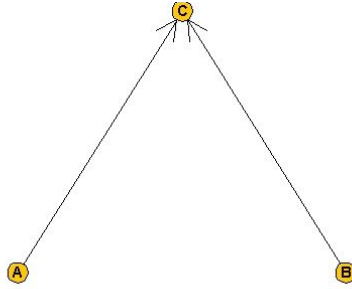
each arrow represents the separate support that a premise gives to (C). On our view, there will thus be a relation of conveyance, and thus an argument, that corresponds to each arrow. However, since (A) and (B) merely offer separate support to (C), their use together does not represent a third relation of conveyance, and thus does not constitute a third argument.[11,12]

7. Deduction and Induction

Let us call a representation of an argument type an argumentation scheme. In the following sections of our paper, we turn to consider two prominent and recent attempts to classify arguments using argumentation schemes, namely those of M. Kienpointner and D. Walton.[13] Doing so further illustrates the need for a conception of arguments such as ours and for a corresponding new classification of arguments. It also illustrates how our conceptions of arguments and argument types are useful in evaluating, and improving, existing classifications of arguments. This is of particular interest in the case of Kienpointner's classification of arguments as it aims to classify arguments according to semantic properties.

We begin our discussion of Kienpointner and Walton's classification systems by considering Kienpointner's approach to the traditional distinction between deductive and inductive arguments. He rejects this distinction on the ground that it is not exhaustive. For example, he suggests that abduction is neither deductive nor inductive (1992, p. 178). However, even if the distinction between inductive and deductive arguments is not exhaustive, it may well play an important role in a natural classification of arguments. Moreover, in light of our discussion so far, we can conclude that it is premature to reject or accept the distinction between inductive and deductive arguments. In order to do so, we need first to determine whether the properties of being deductive and of being inductive argument are properties of arguments, whether they are semantic properties of arguments and whether they are among those semantic properties of arguments that determine argument types.

We cannot, of course, deal with all the issues relevant to determining whether the deductive-inductive distinction corresponds to a distinction between argument types here.[14] However, it is worth indicating that our conception of arguments should be able to assist in dealing with these issues. Most notably, if it turns out that 'being inductive' and 'being deductive' are intrinsic properties of arguments, our conception of argument will allow us to determine whether these properties constitute types of arguments. If inductive arguments represent a common relation of conveyance and do so in virtue of their being inductive, we will be able to conclude that being inductive constitutes an argument type. So too, if deductive arguments represent a common relation of

conveyance and do so in virtue of their being deductive, we will be able to conclude that being inductive constitutes an argument type.[15]

8. Kienpointner's Taxonomy

Kienpointner attempts to compile an exhaustive list of argument schemes. The most basic distinctions he draws between classes of argument schemes are as follows:

> Descriptive vs. normative
> Real vs. fictitious
> Pro-argumentation vs. contra-argumentation

With respect to Kienpointner's distinction between descriptive and normative argument schemes, we agree that such a distinction needs to be made. However, we differ as to how the distinction is to be made.

According to Kienpointner, descriptive argument schemes contain only descriptive propositions whereas normative schemes contain descriptive and normative propositions in their premises, and normative propositions in their conclusions (1992, p. 180). However, there are examples that conform to this criterion, but are not normative. Consider the following argument:

> (4) John thinks that he ought to go home, because he always believes what she tells him and she told him that he ought to go home.

Normative propositions are contained both in the premises and the conclusion of (4). Nevertheless, (4) does not seem to be a normative argument. The warrant it uses is, 'He always believes what she tells him' and it is this warrant that allows us to draw the

conclusion 'John thinks that he ought to go home.' Moreover, the fact that this warrant implies the conclusion it implies has nothing to do with the fact that the conclusion in question contains a normative proposition. The argument could, for example, equally have contained the premise 'She told John that she likes him,' and this would have implied, given the same warrant and despite the absence of any normative propositions, the conclusion 'He believes she likes him.' Thus, intuitively, it seems that the fact that (4) contains normative propositions is irrelevant to the type of argument it is.

Appealing to our conception of arguments yields the same conclusion. (4) represents the fact that, a, she told him that he ought to go home and the fact that, b, John thinks that he ought to go home. It also represents a's bringing b about through the causal rule that he always believes what she tells him. Since, relation of conveyance determines argument type and since in this case the relation in question consists in the instantiation of a causal rule, we should classify (4) as an argument from causal rule rather than as a normative argument.

Fortunately, a natural way of improving on Kienpointner's definition of normative arguments suggests itself. If such arguments constitute a type of argument, they will all represent the same relation of conveyance. Our suggestion is that the relation in question is that of one or more facts constituting some normative fact. Thus, it has the form '$x_1 x_2...x_i$ constitute normative fact z' where x_i and z are placeholders for propositions. This definition excludes (4) from counting as a normative argument since, while the conclusion of (4) contains a normative proposition, this conclusion does not describe a normative fact, that is to say a fact about what should or should not be the

case. Rather, it describes the fact that John believes that a certain normative fact is the case.

Here is an example of an argument that does count as a normative argument on our criterion:

> (5) They shouldn't be sent back to their homes, because they will be tortured if they are.

On our understanding of this argument, the fact that they will be tortured if they are sent back to their homes is used to draw the conclusion that they shouldn't be sent back to their homes on the (implicit) grounds that, in the circumstances, the fact that they will be tortured if they are sent back constitutes or makes it the case that they shouldn't be sent back to their homes.[16]

Kienpointner's distinction between real and fictitious argument schemes is one we suspect should be rejected. On this distinction, arguments that conform to real schemes only contain propositions about the actual world and are formulated in the indicative mood, whereas arguments that conform to fictitious schemes also include propositions about what might be the case and are formulated in the subjunctive mood (1992, p. 179). Once again, however, we ought to wonder whether this semantic distinction corresponds to a distinction between argument types, and thus whether it is one that a natural classification ought to capture.

In any case, it is not clear that Kienpointner succeeds in making a semantic distinction here. Arguably, all statements about the actual world that are formulated in the indicative mood have implications for what might be the case.[17] Thus, even though

statements about what might be the case are not explicitly part of all arguments that contain indicative statements, all such arguments are arguably equivalent to arguments that contain both indicative statements and statements about what might be the case.

Pro-argumentation is argumentation that supports some controversial claim and contra-argumentation is argumentation that tries to refute a controversial claim. This distinction also fails to classify arguments according to their natures. The distinction turns upon whether some controversial claim is supported or not. But being a controversial claim is not an intrinsic property of any proposition. Rather, it is a function of the context in which the proposition is used, and specifically, of the audience considering it. Thus, being a controversial claim cannot be relevant to constituting an argument type. So too, being an attempted refutation, i.e. actually being employed in order to refute some proposition, is not an intrinsic property of any argument, and so cannot play a part in constituting an argument type.

In criticising the relevance of the distinction between pro-argumentation and contra-argumentation to a natural classification of arguments, we do not imply that this distinction is not of significance. Following Dung's treatment (1995) of this distinction, and as with other distinctions that depend on context, our view is that it may be of significance, but that work in AI requires that we first develop a natural classification of arguments and only then attempt to deal with contextual issues.

In addition to the three general distinctions just discussed, Kienpointner classifies argument schemes according to warrant type and status of warrant. Kienpointner identifies warrants with those of the premises of arguments that are stated

to guarantee the step from that premise that is used to support or attack a controversial opinion to the conclusion (1986, p. 276).[18] For example, the premise that all men are immortal is a warrant when it is used to guarantee the inference from the observation that Socrates is a man to the conclusion that he is immortal. Now, Kienpointner supposes that to each warrant type there corresponds an argument scheme. Examples of such schemes include causality schemes and subsumption schemes. So too, Kienpointner distinguishes between argument schemes according to the status of their warrants, that is to say according to the way arguments that conform to them use warrants. Specifically, Kienpointner distinguishes between schemes the instances of which are used to establish warrants for their use in further discussion (warrant establishing schemes) and schemes the instances of which contain warrants only as premises used to establish conclusions (warrant using schemes).

The classification of warrants according to their status is not, however, based on semantic properties. Whether a warrant is or is not used for further discussion, that is to say its status, in no way changes its meaning, and thus does not reflect a difference in its semantic properties.[19]

Kienpointner's classification of arguments according to the type of warrant they employ is the most powerful component of his approach. Indeed, we agree that to each warrant type there corresponds an argument type. But problems remain with his notion of warrant. In order to maintain that for each argument type there is a corresponding warrant type, a purely semantic notion of warrant is needed. However, on Kienpointner's view, whether a proposition is or is not a warrant is, at least partly, a

function of the context in which it used. A proposition will be a warrant only if it is stated to assist in supporting or refuting some controversial proposition. But whether a proposition is controversial or not is a matter of context.

In addition, J. B. Freeman has already shown that notions of warrant such as Kienpointner's fail to distinguish between warrants and non-warrants (1991, pp. 53-88). We will not recapitulate Freeman's position at length. However, his main worry can be put briefly. Supposedly, a premise is not a warrant if it is used to support or attack some controversial opinion. A warrant, we are told, merely guarantees the inference drawn for or against such an opinion. However, if a warrant guarantees an inference, then surely it too is used to support or attack an opinion.[20]

In any case, while we agree that to each argument type there corresponds a warrant type, we suspect that this observation alone does not assist in constructing a natural classification of arguments. This is so since warrants are, by definition, reasons or justifications, that is to say ways of arguing. Thus, claiming that arguments should be classified according to warrants is, in itself, no more informative than claiming that they should be classified in accordance with ways of arguing. What we need if the notion of 'warrant' is to assist us in classifying arguments is a substantial explication, rather than a merely nominal definition, of it.

The view of warrants that naturally goes along with our conception of arguments is that warrants are propositions that represent one or more entities that are not facts as conveying another entity, that is also not a fact, via a relation of conveyance. Thus, propositions that represent a property as conveying another property, or a particular as

conveying another particular, are warrants. However, arguments themselves are never warrants because they represent *facts* as conveying other *facts*.

Let us clarify the above. The proposition 'Smoking causes cancer' represents one entity as conveying another via a relation of conveyance. Specifically, it represents the property designated by 'being a smoker' as conveying the property designated by 'being ill with cancer' and as doing so via the causal relation. Moreover, since properties are not facts, it does not represent one fact as conveying another. Thus, 'Smoking causes cancer' is, by our definition, a warrant. At the same time, 'Smoking causes cancer' is not an argument and is not classified as such by our view of arguments.

Our definition of warrant identifies both an argument type and a warrant type for each relation of conveyance, and thus allows us the desired conclusion that for each argument type there is a warrant type and that for each warrant type there is an argument type. So too, it gives us a fully semantic notion of warrant, one that appeals only to the intrinsic properties of warrants. Finally, it captures the intuition that warrants are used in arguments but are not themselves arguments.[21]

9. Presumptive argument

Kienpointner further develops his classification of arguments in some detail, acknowledging some types of argument that are neither warrant using nor warrant establishing and going on to classify warrant using schemes in some detail (1992, pp. 181-2). However, we propose to continue our examination of the problems that arise in

attempting to classify arguments according to warrant type by looking at a major aspect of Walton's classification of arguments. In his *Argumentation Schemes for Presumptive Reasoning*, Walton takes a pragmatic approach. Rather than attempting to offer a systematic classification of all argument types he undertakes instead to outline, to justify and to explore real-world examples of a substantial number of such types. Further, taking his cue from Kienpointner, Walton classifies arguments in accordance with warrant type (1996, p. 3).

Walton distinguishes between three fundamental classes of argument, namely deductive, inductive and presumptive (1996a, p. 39). We have already briefly discussed the distinction between deductive and inductive arguments, and so will focus on what Walton calls presumptive arguments. Presumptive arguments are, according to Walton, "plausibilistic in nature, meaning that if the premises are true (or acceptable), then the conclusion does not follow deductively or inductively, but only as a reasonable presumption in given circumstances of a case, subject to retraction if those circumstances should change" (1996, p. 13). Walton suggests that inductive and deductive arguments are such that the presumption is against whoever proposes them. A proponent of any such argument is obliged to defend her argument if challenged. By contrast, he claims, presumptive arguments are essentially such that the presumption is in favour of whomever proposes them. The opponent of such an argument is obliged either to accept the argument or to give evidence against it (1996, p. 27). This characterisation contains epistemic and pragmatic elements in addition to semantic ones. Thus, it cannot form the basis for a solely natural classification of arguments.[22]

Moreover, it breaks down the original tripartite division of arguments into deductive, inductive and presumptive arguments. This is seen in that neither deductive nor inductive inferences are characterised as such in virtue of their epistemic and pragmatic properties. Rather, they are characterised as they are because of their semantic or formal properties. Deductive and inductive arguments are, then, neither intrinsically presumptive nor intrinsically non-presumptive. And one is free to hold, as some do, that the conclusions of some, or all, such arguments are themselves at best merely reasonable presumptions given the truth (or acceptability) of their premises and the circumstances of the case. Further, one is free to hold that whether the conclusion of a certain deductive or inductive argument is or is not plausible given the truth (or acceptability) of its premises depends on the context in which it is being considered.

Indeed, not only is one free to hold that deductive and inductive arguments are presumptive in Walton's sense, but at least in some cases, one should do so. Let us illustrate this in the case of deductive arguments. Some deductive arguments can be so complex so as to render their conclusions (at best) plausible, irrespective of how acceptable their premises are. So too, the conclusion of a deductive argument may merely be plausible irrespective of how acceptable its premises are when the deductive logic it uses is itself subject to doubt.[23]

10. Argument from Ignorance

Let us consider one more of Walton's proposed argument types in order to further illustrate how our views can be used to reconsider and modify existing classification schemes.

Walton outlines a significant number of classes of presumptive argument. Examples of these include argument from sign, argument from example and argument from position to know. He goes on to suggest that the presumptive arguments he discusses in his book are generally arguments from ignorance. He tells us that, "the logic of these arguments could be expressed by the phrase 'I don't know that this proposition is false, so until evidence comes to refute it, I am entitled to provisionally assume that it is true'" (1996, p. 111). Moreover, the warrant that licenses the inference from 'I do not know that this proposition is false' to 'I am entitled to assume that it is true' is 'the proposition being considered is of such a type that if it were true, I would know it' (1996, pp. 112-3). Less roughly, these arguments tend to have the form (1996, p. 124):

> (a) It has not been established that all the true propositions in domain D are contained in K
> (b) A is a special type of proposition such that if A were true, A would normally or usually be expected to be in K
> (c) A is in D
> (d) A is not in K
> (e) For all A in D, A is either true or false
> > Therefore, it is plausible to presume that A is false.

However, since this is in part a formal characterisation rather than a purely semantic one, it cannot be the characterisation of a type of argument. Nor, for the same reason,

can it yield a classification of arguments according to the type of warrant they use. Warrants are propositions and so not, even in part, formal entities.

It is sometimes the case that an instance of (b) looks as if it includes a claim to ignorance. For example, consider a case in which there is inconclusive evidence that medicines within a certain class of medicines have no serious side effects. In such a case, a doctor might legitimately presume that a certain medicine that belongs to the class has no serious side effects, and she may justify herself by saying that if it were true that a medicine from within the class in question had severe side effects, she would have known about it. Here, it seems, we have a warrant that takes an expression of ignorance, namely the doctor's lack of knowledge of the existence of serious side effects, as its premise. However, it is merely the way in which warrants such as the doctor's are sometimes expressed that makes them sometimes appear to be appeals to ignorance. In her case, for example, assuming that it is true that she would have known about the serious side effects of the tested medicines had such effects existed, the facts that make this true are roughly that the doctor presumes that the medicines in question are safe because they have passed various trials, and that they passed these trials because they do not have severe side effects. Thus, the doctor's warrant is more aptly formulated as the claim that if it were true that the medicines in question had severe side effects, she would not have presumed that they passed the trials they passed. This formulation, we take it, captures the actual warrant available to the doctor, and the original argument that she intended to convey, in a less misleading way. Now, however, it is clear that it is an

expression of reasonable belief that the medicines have no serious side effects, rather than an expression of ignorance, that serves as the premise in the doctor's warrant.

Indeed, we are now in a position to reclassify the argument that we have envisaged being used by a doctor. The warrant being used is that 'if it were true that the medicines in question had severe side effects, she would not have presumed they passed the trials in question'. This warrant states that two facts are causally dependent. Moreover, it proceeds from effect to cause, rather than from cause to effect. Thus, on our view, it should be classified as an argument from effect to cause.

Perhaps we are being unfair to Walton in that the principle of classification he is using is being extended so as to take more than arguments' warrants into account. A proposition that conforms to (d) informs us that A is not included in K, and thus leaves us in a state of ignorance about A, at least in the sense that it gives us no positive information about A. Perhaps, then, Walton supposes that arguments from ignorance are such because they employ claims that conform to (d), along with warrants that conform to (b). This, however, is also problematic from our perspective. Once again, the form of a proposition is irrelevant to the natural classification of an argument in which it is a premise. Moreover, the fact that a proposition conforms to 'A is not in K' does not imply that it has some semantic feature that allows us to single it out as an expression of ignorance. Where the domain of propositions, D, is given and it is known that A is in D, propositions of the form 'A is not in K' can be presented with the form 'A is in $D \setminus K$', and thus as propositions that tell us something positive about A.[24] Conversely,

propositions of the form '*A* is in *K*' can be reformulated so that what they are not giving us information about is explicit.

11. Possible Relations of Conveyance

The above concludes our discussion of existing classification schemes. As we have seen, when examining such schemes, we can, in light of our conception of argument types, learn something about which argument types there are. However, how are we to go about developing a complete classification of arguments? Given our view that an argument's type is determined by which relation of conveyance it represents, along with how it represents the relation of conveyance in question as ordering facts, this question becomes the more manageable question of how are we to go about outlining an exhaustive classification of relations of conveyance.

The question of which relations of conveyance there are can be addressed partly by uncovering the presuppositions that various domains of natural discourse make about the types of entity there are and about the interrelations that can exist between these entities. Knowledge of these presuppositions will, among other things, assist us in determining which relations of conveyance there might be, and thus ought to be of assistance in determining whether we have or have not enumerated all of these.

On the face of things, for example, we have seen that discourse in general presupposes the existence of non-normative facts and normative facts. Thus, one of the questions we will have to ask is what types of relationships exist between non-normative

facts, between normative facts, and between non-normative and normative facts. Each of these relations will constitute the possibility of additional types of arguments.

We will, in addition, be able to go well beyond merely enumerating those relations of conveyance that can be represented by this or that realm of natural discourse. We can do so by examining the wide variety of theories metaphysicians have outlined about what types of entity there might be, and about how entities might be interrelated.

12. Conclusion

We have suggested, and argued, that an argument is a proposition that represents a fact both as conveying some other fact and as doing so wholly. We justified this suggestion through an analysis of that concept of argument according to which an argument is the outcome of a reasoning process and through a consideration of the way in which 'that' clauses can be used to express arguments. We also justified it by showing that it is better than standard explications of 'argument' in determining the identity conditions of arguments, in explanatory strength and in usefulness in suggesting how arguments ought to be classified.

The criterion of argument type that we have suggested should be used in a natural classification of arguments is that two arguments are of the same type if and only if they represent the same relation of conveyance and, further, represent it as ordering the arguments' conveying and conveyed facts in the same way. As a result, developing a natural classification of arguments requires an enumeration of possible relations of

conveyance. The next step is, of course, to attempt such an enumeration, and to develop

a corresponding classification of arguments.[25]

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[1] See C. A. Reed and T. J. Norman (2003).

[2] C. Lumer also develops a concept of argument that, while accounting for a variety of argument types, abstracts from contextual and pragmatic factors (1991).

[3] Roughly, we are thus interested in what D. J. O'Keefe calls 'argument$_i$' (1977).

[4] The idea that arguments are propositions is an old one. See, for example, B. Bosanquet's related conception of arguments as a species of judgment (1888, pp.1-2).

[5] See E. C. W. Krabbe's "Profiles of Dialogue" (1999).

[6] Notice that the fact that some proposition represents one fact as conveying another does not imply that these facts obtain.

[7] The term 'likely' should not, in the present context, be thought of as denoting some form of subjective probability, but rather as denoting some form of frequency probability.

[8] See, for example, I. M. Copi and C. Cohen (1990).

[9] If the distinction between propositions and sets or sequences is not obvious, note that propositions are the primary bearers of truth and falsity. Sets and sequences, by contrast, can be neither true nor false.

[10] Wreen actually writes of individuating arguments by inferences. We take it, however, that he means relations of implication. Nothing of significance depends on this.

[11] This illustrates that, as Reed and Walton claim, argument diagramming goes hand in hand with argument individuation (1999).

[12] It would, at this point, be natural to consider the complex problem of the nature of convergant support. We cannot, however, do so here.

[13] These classifications are merely two indicative of a growing number of recent attempts to classify arguments. One of the earliest of these is that of C. Perelman & L. Olbrechts-Tyteca (1969).

[14] See G. Harman for a presentation of some of these issues (1986).

[15] As we will see in discussing Walton's view of presumptive arguments (section 9), the probative strength of an argument might depend on whether it is a deductive or an inductive argument. If this is correct, then the important issue of determining whether probative strength is an intrinsic property of arguments and, further, relevant to their classification, depends in part on what work on the nature of the inductive/deductive distinction reveals. It is worth noting, however, that our discussion of presumptive arguments suggests that the probative properties of an argument do not supervene merely on

properties such as being deductive or being inductive.

[16] We have assumed that normative propositions represent facts and have truth-values. That they can do so just as non-normative propositions can is suggested by the fact that the grammatical and logical behaviour of normative propositions is not distinguishable from that of non-normative ones (See C. Wright (1996) and P. Railton (1996) for recent arguments along these lines). So too, a uniform treatment of non-normative and normative sentences allows a uniform treatment of normative and non-normative arguments. If normative sentences do not express propositions that can be true or false, it is hard to see how they can be thought to express propositions at all. And if they do not express propositions, it is hard to envisage a definition of 'argument' that would cover both normative and non-normative arguments.

[17] For a discussion of the subjunctive implications of indicative statements see D. H. Mellor's "In defence of Dispositions" (1974, p. 171).

[18] Kienpointner here borrows from S. Toulmin's notion of warrant, although he does not follow Toulmin in requiring that

warrants be general propositions (1958, p. 98).

[19] D. Hitchcock, it is worth noting, argues that warrants are not themselves premises in arguments (2002). However, Kienpointner's definition of 'warrant using schemes' assumes that warrants sometimes are premises.

[20] Hitchcock responds to Freeman's critique at length (2002). However, he focuses on Freeman's objection to Toulmin's (alleged) insistence that general propositions always function as warrants when used in premissory position. He does not discuss that aspect of Freeman's argument that we endorse here and take to be of major significance.

[21] On our view, arguments use warrants in order to represent entities that are related by relations of conveyance as being situated within facts, and thus as playing a part in making it the case that one fact conveys another. We cannot, however, go into this in detail here.

[22] Walton himself endorses a pragmatic conception of argument and so may not be worried by this conclusion (1990).

[23] Arguably, some deductive arguments do not even warrant the status of presumptive arguments. The Sorites Paradox, for example, seems to be a deductive argument with acceptable premises and a contradictory, and hence, unacceptable, conclusion.

[24] '$D \setminus K$' represents all the elements in D that are not in K.

[25] Thanks to Walton, Kienpointner and two anonymous referees for helpful comments on drafts of this paper.