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### The identification and evaluation of arguments – A task too important to leave to the logicians

Abstract: A commonly stated purpose for logic is evaluation of arguments. This paper describes the classical view, raises questions regarding its adequacy, and on the basis of the deficiencies found discusses ways to amend and refine the classical conception to make it more applicable to ordinary discourse.

**Resumen:** Un propósito comúnmente asignado a la lógica es la evaluación de argumentos. Este artículo describe la visión clásica, cuestiona su adecuación, y con base en las deficiencias encontradas discute maneras de corregir y refinar la concepción clásica para hacerla más aplicable al discurso ordinario.

# 1. Introduction – What is an account of argument?

There is general agreement that logic involves having a theory of argument. To have such a theory one minimally needs to: (i) make clear what we mean by an argument; and (ii) specify criteria for correctness and incorrectness. Unless we simply desire to develop an abstract theory we also need to be concerned about how we can identify arguments in ordinary discourse and what the process is for applying our standards to these entities. In other words not only provide the theory, but also demonstrate how the theory can be used to analyze and evaluate ordinary discourse. For this purpose direction in analyzing passages of ordinary prose needs to be provided and the theory needs to be complete enough so that not every passage of ordinary discourse to be analyzed contains situations which the theory does not address.

I want to consider the standard answer to these questions and develop a catalog of issues raised regarding the adequacy of this position.<sup>1</sup> I want to claim that these issues suggest the classical position needs to be extended in numerous respects and that this extension takes the tasks of argument identification and evaluation beyond what is normally considered the purview of the logician. This catalog of issues is being constructed as a preliminary study in hopes of ultimately being able: (i) to construct a theory of argument which combines the insights of both proponents of the classical position and its critics and (ii) to design a course which effectively teaches logic which students can successfully apply to everyday discourse. What I do in this paper is review the classical position, point out some deficiencies, and indicate the programmes of activities that need to be carried out in order to establish a more complete theory as well as to design the desired course.

### 2. The classical position

One of the places we frequently lay out the theory of arguments and show how it is to be applied is in introductory logic classes. Consequently, I will base my description of the classical position in what is found in texts used in such courses.<sup>2</sup>

#### 2.1. Argument definition

An argument is a set of statements all but one of which are used to bring forward evidence for the remaining one. The statements being used to bring forward the evidence are called *premises* while the statement for which the evidence is being brought forward is called the *conclusion*. Two types of arguments should be noted. There are *non-ampliative/demonstrative arguments* in which the intent is to present evidence for a conclusion which contains no information not already contained in the premises. There are *ampliative/non-demostrative arguments* in which the intention is to present evidence for a conclusion which contains more information than is contained in the premises.

#### 2.2. Evaluation standards

Two different sorts of questions are usually asked in the course of argument evaluation: (i) are the premises appropriately related to the conclusion, i.e., do the premises provide the required support for the conclusion? and (ii) are the premises, in fact, true? The first of these is the question of logical correctness. An argument is logically correct if the truth of its premises provides good grounds for accepting the conclusion as true. First, notice that this version of the correctness characterization imposes a specifically semantic condition. Second, we need to unpack what counts as "provides good grounds for". Customarily that is done in two ways. The classical criterion of logical correctness is that employed for non-ampliative/demonstrative arguments — it is impossible that the premises should be true and the conclusion false. This criterion is usually referred to as the criterion for deductive validity. A second way of specifying what constitutes good grounds - it is highly improbably that the premises should be true and the conclusion false - is the ampliative/ nondemonstrative criterion of logical correctness

which is often referred to as the criterion of *inductive strength*. The second question — the one regarding the actual truth of the premises — is traditionally labeled the *soundness* question.

#### 2.3. Evaluation techniques

What is customarily done in determining logical correctness and soundness? What are the important differences in determining the two types of logical correctness?

#### 2.3.1. Logical correctness

### 2.3.1.1. Non-ampliative/Demonstrative inferences

The evaluative question in deductive logic for any argument is whether it is valid. The key notion here is that of an exceptionless guarantee. One can never have all true premises and a false conclusion. Showing that it possible to have all true premises and a false conclusion demonstrates that the criterion of demonstrative logical correctness is not satisfied. On the other hand showing the impossibility of a counterexample demonstrates deductive validity. To accomplish this we first determine its form. Once we have ascertained the form of the argument we apply some formal method to determine whether the premises of any argument having that form could be all true and the conclusion false.<sup>3</sup> There are numerous techniques for determining deductive validity, e.g: truth tables, truth trees, Venn diagrams, logical derivations.

## 2.3.1.2. Ampliative/Non-demonstrative inferences

There is no exceptionless guarantee in ampliative logic and because of this looking for a counterexample is not part of the strategy. The most common treatment is to discuss several examples of this type of argument – arguments by analogy, inductive generalization, correlation arguments, causal arguments, etc. Usually this discussion includes some brief pointers on how to identify the particular kind of argument and several pertinent evaluation considerations.

## 2.3.1.3 Differences in determining logical correctness

The difference with respect to a guarantee sets up different tasks in the effort to ascertain logical correctness. In deductive/non-ampliative logic the effort is directed towards either establishing a counterexample or proving that one does not exist for the argument form under consideration. This is an invariable property of the form and does not vary from one use of the form to another or depend on the context in which the form is used. In contrast in inductive/ ampliative logic one is guaranteed that the case of all true premises and a false conclusion is possible for any argument form being considered. As a result what needs to be examined are the circumstances in which the form is being used to determine the impact these particular circumstances have on the probability of going from all true premises to a false conclusion. Logical correctness in deductive/non-ampliative logic is a property of the form and not context dependent whereas logical correctness in inductive logic is a property of a particular occasion of use of the form.

Moreover, in deductive logic there is a "right" answer which can be determined solely via semantic methods. Either it is possible to produce a counterexample or it is not. There is no context dependency here. In non-demonstrative logic different contexts (i.e., different knowledge states) can produce different evaluations of logical correctness. As new knowledge is acquired the assessment of logical correctness of the argument may change. The assessment of logical correctness for ampliative logic is context dependent.

Another major difference is that the logical form (precise syntactical formulation) of individual statements does not play as significant a role in ampliative logic as it does in deductive logic. While texts continue to talk about the form of an argument when doing ampliative/non-demonstrative logic it takes on another meaning. Determining the form here requires looking at the functional role played by various claims. For example, in an argument by analogy the premises – no matter what the logical form of the individual statements – make a comparison between two items or types of items showing that they share some properties in common and that one of the them has some additional property. The conclusion makes the declaration that the other item too is likely to have the additional property. Instead of the type of form you have in deductive logic what you have here is really an *argument schema*. A number of specific forms may meet the requirements of the schema.

These differences make inductive logic a more complicated subject to treat at an elementary level than deductive logic. These differences also point out that the only aspect of evaluating for logical correctness which is not context dependent is the evaluation of a given form for deductive validity.

#### 2.3.2 Soundness

Of these two evaluation questions - logical correctness and soundness - only the question of deductive logical correctness is regarded as truly and solely in the province of the logician. Both the assessment of inductive logical correctness and the assessment of the truth of individual statements frequently require empirical knowledge. However, it is often pointed out that there are certain kinds of statements whose truth or falsity the logician can ascertain – logical truths and logical falsehoods. It is also possible for the logician to discuss the possibility of definitely determining the truth or falsity of a particular type of assertion, e.g., that universal affirmative claims can be definitively falsified, but not definitely confirmed in an infinite universe. However, generally it is not the case that determining the truth of a claim is a matter of logic.

#### 2.4. Application

In discussion of the application of the classical theory it is useful to start with the notion of standard logical form. An *argument in standard logical form* has a number of characteristics: i) each different premise is started on a new line;<sup>4</sup> ii) all the premises precede the conclusion; iii) some type of notation is used to distinguish the conclusion from the premises; iv) the logical form of the individual statements is clearly displayed by paraphrasing if necessary; v) statements are paraphrased to improve clarity if necessary; vi) redundancy is eliminated; and vii) all premises including tacit or suppressed premises are made explicit.

There is not uniform agreement on what counts as application of this theory of argument. If arguments are already in standard logical form, then the utilization of the techniques for determining logical correctness often is interpreted as the application question. If the arguments are not in standard logical form, then getting them into standard logical form becomes part of the application question. The most ubiquitous exercise found is to sort an argument in which the premises do not precede the conclusion into a ordering which does. In addition to premise/conclusion order the traditional concerns in this area have involved (i) discussing the fact that grammatical sentences are not the basic element of assertoric logic - in particular what we need to focus on are the individual truth-valued units separate from the sentences which contain them; (ii) getting clear on exactly what statements are being made by the natural language sentences being used, e.g., dealing with problems raised by vagueness and ambiguity; (iii) dealing with issues regarding unstated claims what are the criteria determining what may be appropriately added; and (iv) if possible identifying the form or schema of the argument as a named form or schema.

All of this assumes that an argument has already been identified. However, when reading ordinary text argument identification can be one of the most difficult tasks. Standard advice given with regard to identifying arguments and their constituent parts is to look for certain categories of words. One needs to look for:

- (i) argument structure words/phrases because, therefore – which indicate an implication and help to separate the premises from the conclusion;
- (ii) logical structure words not, and, or, ifthen, all, some – which are used in determining the logical form of the statements;

- (iii) argument type indicators it is probable that, it definitely follows that – which help make the determination whether one is dealing with a demonstrative or non-demonstrative argument;
- (iv) key words/phrases is similar to to help determine non-demonstrative argument schema.

Frequently, fairly extensive lists of these types of words/phrases are given with the caution that the lists are not exhaustive and that the words on the lists can function in a variety of ways.

# 3. Questions about the classical position

There are a variety of questions which have been raised regarding this classical conception of arguments and their evaluation. Among them are: (i) are there additional argument evaluation standards? (ii) are the classical standards deployed in argument evaluation the correct standards to use? (iii) are the standards for claim evaluation the appropriate ones? (iv) does this classical characterization of an argument clearly capture the ordinary conception of argument? (vi) is it the case that claims only play a single role in arguments? (vii) does this account for all the ways arguments are used? (viii) are there useful ways of characterizing argument patterns other than describing argument forms?

#### 3.1. Evaluation standards and techniques

Are there additional criteria for argument evaluation in addition to logical correctness and soundness? Is truth the appropriate evaluation standard for the individual claims of which an argument is composed?

# 3.1.1. The need for an additional argument evaluation standard

Are the evaluation criteria adequate for ensuring that we have a "good" argument? Consider the following argument:<sup>5</sup> All males who take birth control pills will not become pregnant.

John Jones is a male who takes birth control pills.

John Jones will not become pregnant.

This argument satisfies the deductive criterion of logical correctness – the truth of the premises is sufficient to guarantee the truth of the conclusion. The argument also has true premises: the first premise is an empirical truth and since John Jones is my creation I can give him whatever odd chemical dependencies I choose. Thus the argument is sound. Consequently, the argument satisfies both of the standards given so far for being a good argument. However, the customary intuitive reaction is that this not a good argument. This suggests that there is another evaluation standard which this argument does not satisfy.

In this particular case the way in which the argument goes awry is fairly clear. We believe that being placed in the category of being male is sufficient to guarantee that the individual will not become pregnant. Consequently, we believe that a stronger argument would be:

All males will not become pregnant. John Jones is a male. John Jones will not become pregnant.

In this case our background information informs us that the original argument was not utilizing the best reference class — the class "males" is better than the class "males who take birth control pills." Ultimately we are not only looking for an argument which is logically correct and has true premises, but one which we regard as the strongest argument available for the conclusion.

In making this determination we needed to consider how the specific argument instance is related to other information available to us. Here we have another way in which arguments are evaluated — by their connection with other information. There are various ways in which the connection is assessed. Alternate positions and objections are part of the connection to other information. Types of questions to raise when doing this type of evaluation include: How well are known objections to the position dealt with? How well is the position taken distinguished from other positions on the issue? What arguments can be given against these other positions? How well are questions about the consequences handled?<sup>6</sup>

# 3.1.2. The need for refinement of existing standards for claim "goodness"

#### 3.1.2.1. Variety of claims in arguments

On the standard conception we are dealing with assertions - claims which can be true or false and usually these are empirical claims. However, a quick check of arguments found in ordinary discourse suggests that there are other types of claims functioning as premises or conclusions in the arguments - value judgments both ethical and aesthetic, definitions, as well as more complicated assertions, e.g., modal claims. Not all of these claims are regarded as either simply "true"or "false". This suggests that the standard definition of soundness needs to be generalized. The intuitive idea behind soundness is that all of the premises have appropriate epistemic standing. In generalizing the questions which need to be asked include: What types of claims occur in arguments? What is the appropriate status and how is it assessed for each of the types of claims which appear in the argument?

#### 3.1.2.2. The standard for assertions

Whether truth is the appropriate standard for assertions is a question which has also been raised. One issue is whether requiring that a statement be true is too restrictive. It has been suggested that well confirmed would be more appropriate. A second question has been raised whether truth or any of its weaker relatives is the appropriate status for assertions. Several alternatives have been proposed. One by James Freeman suggests substituting the more legalistic notions of presumption and burden of proof criteria.<sup>7</sup> Another suggests accepted by the audience for whom the argument is intended.<sup>8</sup>

# 3.1.3. Techniques for evaluating ampliative arguments

The classical position has been that all that can be done is to illustrate with examples. Are there useful general techniques which can be employed to evaluate ampliative inferences for logical correctness? Clearly there will not be the same kind of techniques as there are for nonampliative inferences, but it may be possible to provide a more systematic account than has been customary.

#### 3.2. The conception of an argument

Does the classical characterization of an argument as "a set of statements all but one of which are used to bring forward evidence for the remaining one" satisfactorily capture customary usage? Are the concepts of "argument" and "logical consequence" used interchangeably in ordinary discourse? Are there more complicated argumentative structures than are recognized by the standard characterization? Do all arguments have the same function?

# 3.2.1. Argument, logical consequence, implication, and explanation.

There are deductively valid argument forms which individuals who have not been corrupted by training in formal logic have difficulty accepting as arguments.<sup>9</sup> Prime examples are disjunction and simplification:

Disjunction	Simplification
A	<u>A&amp;B</u>
AvC	А

Disjunction usually seems problematic in a number of ways including doubts that it is a valid deductive argument form until a truth table is worked out. In contrast simplification is readily seen to be valid, but the intuitive reaction is that these forms don't really represent arguments.

This seems to suggest that not all implications have the same standing as arguments. Moreover, there appear to be implications which are things other than arguments. In particular explanations frequently involve implications.

Silver, mercury, and all the other metals except iron and zinc, are soluble in diluted sulfuric acid, because they have not sufficient affinity with oxygen to draw it off from its combination either with sulfer, the sulfurous acid, or hydrogen.<sup>10</sup>

What is it that distinguishes the sets of statements in which one of their members is a logical consequence of the rest as an argument from those which are not? It has been suggested that what is characteristic of a argument generally is the existence of a proposition that is unsettled or contentious. This can occur in a variety of ways – the information may be new, the information may be in dispute, etc. This unsettled proposition occurs in a discourse which could potentially settle it.<sup>11</sup> If this is accepted, then while one can determine whether there is a logical implication without an examination of the context, one can only determine if the implication is an argument by an examination of the context.

#### 3.2.2 Extended Arguments

It does not require much looking in ordinary discourse to find argumentative passages in which the same claim is functioning both as a premise and as a conclusion. For example:

Since all of the beans from the container that we have examined have been pinto beans, it is reasonable to conclude that only pinto beans are in the container. Any beans that are pinto beans are edible beans. Therefore, the beans in the container are edible.

Here we have "only pinto beans are in the container" serving as both the conclusion of an inductive generalization and as a premise in an immediately following deductive argument. This suggests that the conception of argument needs to be generalized beyond the original classical characterization of an argument.

An initial set of distinctions which might help us sort through a more complex conception of argument is the following. If no reasons are given in the argument to support a particular premise that premise is called a basic premise or basic reason. If a conclusion is not used to provide support for other conclusions it is called a final conclusion. Conclusions used to provide support for other conclusions are called intermediate conclusions. In a single argument, all the premises will be basic reasons and the conclusion a final conclusion. In ordinary discourse arguments rarely come singly. Often a number of arguments are being made virtually simultaneously. These are usually referred to as complex arguments (sometimes as extended arguments). One of the ways in which complex arguments occur is an argument chain. Argument chains use intermediate conclusions. In argument chains the conclusion of the first argument serves as a premise of the second argument and the conclusion of the second serves as a premise of the third, etc. This type of structure is relatively simple. The way in which arguments are presented is often even more complex. These are called "argument nests". A divergent argument is one type of argument nest. In this type of argument the same premise is used to support several different conclusions. In a convergent argument several different single arguments are being given each of which supports the same conclusion. To sort out the relationships among the components of complex arguments various kinds of diagrammatic techniques are frequently employed to display the structure of the complex argument. These structures are different from either argument forms or argument schema. The most frequently used form of diagram is the arrow diagram.<sup>12</sup> An alterative approach is that of diagraph representations.<sup>13</sup>

#### 3.2.3 Functions of arguments

"Does the idea of "support" simpliciter make sense? Aren't we really dealing with "support for a purpose"? The standard definitions for "logical correctness" appear to have the purpose of obtaining "the truth". Are there other purposes for which an argument might be used to provide support for a claim? The answer clearly seems to be "yes". We utilize hypothetical arguments. We use arguments to falsify claims. Consequently, any conception of argument needs to be able to account for these cases.

#### 3.3. Difficulties with applicability

What issues arise when attempting to apply the classical theory? How do you ascertain that there is an argument? Do statements have more specific roles in an argument other than serving as a premise or a conclusion? What are the concerns about interpreting text?

#### 3.3.1 Existence of an argument

The analysis provided so far suggests that seeing lots of arguments in standard logical form or near standard logical form will do little to prepare you for dealing with ordinary discourse. The first question is whether there actually is an argument in the passage. Anyone who has assigned a class to select some ordinary text and identify and analyze the arguments found knows that more skill is needed to accomplish this than might have been anticipated. When looking at a passage of ordinary discourse this is frequently a difficult question to answer. Are there implications in the passage? Are the implications intended as an argument? What is the argument? The customary injunction is to look for implication indicators, then try to identify the conclusion followed by a search for the premises for that conclusion. As we have already seen in the discussion of the concept of an argument, there are potential difficulties with that approach. The socalled argument indicators may only be consequence indicators and as we have seen earlier these need not be an argument. A more deeply contextual analysis is required. How can we deal with these complexities? The earlier suggestion of "unsettledness" made earlier applies here. Are there other possible signposts which might help?

#### 3.3.2. Roles for premises

The paradigmatic case is the single argument with each statement playing a single role in the argument. However, passages in ordinary discourse are more complex. Statements may be playing multiple roles or different roles than those in the paradigmatic single argument. Observation is theory-laden. What you might look for depends on your expectations. Are there some general kinds of argument structures, or roles for premises which you might expect to be looking for? The idea of argument schema raised in conjunction with ampliative inference already suggested that the roles of statements could be an important factor in argument analysis. There are several views which suggest various roles for different claims in an argument.

#### 3.3.2.1. Toulmin

For Toulmin the statements occurring in an argument have various roles.<sup>14</sup> There is a claim, data serving as evidence for it, and a warrant that licenses an inference from the data to the claim.

On Toulmin's account modalities and rebuttals also play a role. Modalities are an indication of how strongly an arguer believes the premises support the conclusion. Rebuttals are undermining conditions.

#### 3.3.2.2. Dialogical interpretation

Another conception of arguments is that they occur in the context of dialogues.<sup>15</sup> Moreover, there are a variety of standard purposes for dialogues. These standard purposes puts constraints on the structure of the dialogue which in term helps determine the structure of the resulting complex argument. Among the dialogue types which have been identified by proponents of this view are: persuasion dialogue, information seeking dialogue, negotiation dialogue, inquiry dialogue, eristic dialogue, and deliberation dialogue.

#### 3.3.2.3. Recurring complex argument structures

Are there complex argument structures which are recurring? In the example of a compound argument considered previously first we found an inductive generalization. Then the conclusion from this inductive generalization was used as a premise in a deductive argument. Some authors have suggested that this is a compound argument structure commonly found in science. Are there some complex argument patterns which occur with some frequency? generally? with respect to a specific discipline?

#### 3.3.3 Textual interpretation

Besides the relatively narrowly focused interpretation questions of ambiguity, vagueness and missing claim, there are broader textual interpretation concerns in accurately reconstructing an argument from a passage of ordinary prose.<sup>16</sup> This is a topic well known to historians of philosophy and too complex to discuss here.

### 4. Implications and tasks

What are the implications of the preceding discussion for the role of the logician? On the basis of the preceding discussion what needs to be done? in terms of tasks which have already been identified? in terms of questions which that need to be addressed? Is there a useful terminology to adopt that captures some of what has been discussed and will facilitate further discussion?

#### 4.1. The unique province of the logician

In the process of this analysis we have discovered that argument identification and most parts of evaluation are context dependent activities. Only the determination that a given argument form is valid or invalid can regularly be made without knowledge of the argument's context. Only this activity is uniquely the province of the logician. For many aspects of argument identification and evaluation in ordinary discourse standard course work in logic does not provide the background and skills required.

#### 4.2. Alternate terminology

This analysis suggests that it would be useful to adopt a more generalized vocabulary for discussing arguments and their evaluation which contains the terminology of the classical position as subcases. The following is an initial effort at this task.

#### A. Argument identification

#### Argument type

- Ampliative argument the intention is to present evidence for a conclusion which contains more information than is contained in the premises.
- Non-ampliative argument the intent is to present evidence for a conclusion which contains no information not already contained in the premises

#### Argument complexity

- Simple argument has a single conclusion and none of the premises are themselves argued for
- Compound argument has premises that are themselves argued for or multiple conclusions
- Argument arrangement pattern of arrangement of information in the argument
- Argument form determined by precise syntactic description of the statements which make up the argument
- Argument schema description of argument based on functional roles of the premises and conclusion
- Argument structure property of a compound argument which is shown diagrammatically.

#### B. Argument evaluation criteria

*Correctness* – premises appropriately related to the conclusion

deductively valid

non-demonstrative logical correctness

*Competence* – statements have appropriate epistemic status

satisfactory definition

accepted value judgment

- appropriately supported assertions classical position is true assertions soundness
- *Connectedness* appropriately related to other available information

proper reference class objections considered implications considered alternatives considered Cogency – satisfies all of the other criteria

#### 4.3. Issues for further development

What needs to be done to further develop the analysis? A summary of topics needing further exploration.

#### Argument definition

Construct an argument definition satisfying the following constraints:<sup>17</sup>

- (i) accommodate indirect proofs;
- (ii) accommodate hypothetical arguments;
- (iii) allow an argument to support a claim;
- (iv) allow an argument to refute or question a claim;
- (v) enable distinctions to be made between arguments, descriptions, explanations, etc.
- (vi) enable distinctions to be made among arguments, implications, and reasoning;
- (vii) count both "bad" and "good" arguments as arguments;
- (viii) provide the basis for criteria which can be utilized to help pick out arguments in everyday discourse;
- (ix) allow for both simple and compound arguments.

#### Argument identification

- (i) Comprehensive theory of argument indicators
- (ii) Common complex argument structures
- (iii) Guidelines for argument identification

#### Argument representation

 Adequate notation for the representation of complex arguments
 Possibility of overall graphical representation of arguments

- (ii) Criteria for argument reconstruction
- (iii) Discipline specific argument patterns

Argument evaluation

- (i) Theory of connectedness
- (ii) Techniques for the evaluation of ampliative inferences
- (iii) Appropriate epistemic statuses for statements and how to evaluate
- (iv) Catalog of the types of claims occurring in arguments and their appropriate epistemic statuses

#### 4.4. Pedagogical questions

What are the implications of this analysis for how one ought to teach an introductory logic course if the goal is to provide the student with skills which are immediately and obviously applicable? What is the skill set required for the student to be able to be able to do this? What are the effective ways of imparting these skills? What is the sequencing of acquiring these skills? How much can realistically be done in a semester? Two strategies have frequently been used. One is to encourage to find arguments being used in everyday contexts and analyze them. The other is concentrate on learning the techniques for ascertaining the logical correctness of arguments and restrict the examples to constructed examples which avoid some of the thornier problems encountered when dealing with arguments in their native habitat. Each of these has difficulties and neither approach is complete. Is there a way to effectively combine these different approaches? Which of the skills can be taught or reenforced interactively via computer? Does this analysis provide any suggestions about how to teach better writing and thinking?

#### Notes

 Most of the difficulties pointed out with respect to the classical position are not original to this paper. They are drawn from a variety of sources. Not all of them have arisen as critiques of the classical position. Drawing them together and trying to sketch out their collective implications is the contribution of this paper.

- 2. The earlier editions of Copi's Introduction to Logic (which is still in use today in its 10th edition) serve as an example of what I am taking as the classical position.
- 3. Freeman (1994), p. 37
- 4. This is not a requirement which affects logical correctness, but does facilitate discussions of soundness. It is also not a very precise requirement as a single premise which is a conjunction could also be split into two separate premises.
- This is based on an argument given by Salmon (1971), p. 34
- Johnson (1996), p. 265
  Govier (1999), Chapters 12 and 13
- 7. Freeman (1994), p. 41. A somewhat related idea lies behind defeasible logics.
- 8. Govier. (1999), Chapter Seven
- 9. Johnson (1996), pp. 77-78
- 10. Hurley (1994), p. 27
- Walton (1996), p. 18 discusses 6 different forms of unsettledness
- 12. Thomas, Stephen N. (1973)
- 13. Walton (1996), Chapter 6
- 14. Toulmin et al. (1979)
- 15. Walton (1992), p. 134. More extensive accounts are found in Walton (1989), and Walton (1989a)
- 16. Walton (1996) p. 213
- 17. Walton(1996) pp. 3-4

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