What is Reasoning? What Is an Argument?

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WHAT IS REASONING? WHAT IS AN ARGUMENT?*

THESE are changing times for logic, as the subject is studied and taught in philosophy departments. In recent years, there has been the advent of informal logic as a growing phenomenon in teaching logic, the demand for critical thinking in education, and increased questioning of the role and usefulness of formal logic. There has also been the remarkable growth of the newly founded interdisciplinary field of argumentation.

In light of these developments, it has become questionable whether there are any longer clear and appropriate definitions of the key terms 'reasoning' and 'argument' with which we can work. Charles Hamblin's[1] pioneering chapter seven, "The Concept of Argument," articulated the nature and importance of the problem with foresight. But as he clearly stated, Hamblin chose to circumvent attempting to address it directly, confining his treatment to the question of what a good (successful) or a bad (fallacious) argument is:

> There is little to be gained by making a frontal assault on the question of what an argument is. Instead, let us approach it indirectly by discussing how arguments are appraised and evaluated (*ibid.*, p. 231).

Although there have been significant developments in the area of informal logic since 1970,[2] the failure to arrive at any clear agreement on, or analysis of, the meaning of the concepts of argument and reasoning is a fundamental difficulty.

A fallacy is often said to be an erroneous argument or an instance of faulty reasoning.[3] But which is it? Or are both characterizations accurate? It seems hard to say, no doubt partly, at least, because of the generality, vagueness and heterogeneity of usages associated with the key terms 'argument' and 'reasoning'.

Rob Grootendorst[4] advocated, "let's stop restricting ourselves to looking upon fallacies as errors of reasoning," because this approach

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[1] *Fallacies* (London: Methuen, 1970).

[2] Ralph H. Johnson and J. Anthony Blair, "Informal Logic: The Past Five Years 1978–1983," *American Philosophical Quarterly*, XXII (1985): 181–196.

[3] See Hamblin, and my *Informal Fallacies* (Amsterdam: Benjamins, 1987).

[4] "What a Pragma-Dialectical Approach to Fallacies Can and Cannot Do," paper read at the Third International Conference on Informal Logic, June 1989.

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trivializes them to "uninteresting mistakes in logical reasoning." Instead, Grootendorst proposes viewing fallacies as bad arguments in the sense of being Gricean failures of co-operation which violate rules of a critical discussion. This highly sensible proposal leaves room for the idea that critical discussion is or can be, however, a reasonable form of discussion because it (in some sense) contains reasoning. Even if we concede, therefore, that fallacies are failures of argument, it could still be true that they are (in some yet to be clarified sense) also failures of reasoning. But, of course, none of this makes any sense unless we can say, in general, what the difference is between argument and reasoning.

Internalists, like Gilbert Harman,[5] have portrayed reasoning as a mental, psychological, or internal process, "a procedure for changing one's view" (*ibid.*, p. 107). Externalists, like Jim Mackenzie,[6] have portrayed reasoning as a process of linguistic interaction that appears to be more sociological than psychological.

Argument has stereotypically been portrayed by logic textbooks as an externally manifested set of propositions "designated" as premises and conclusion. But often, at least in initially describing what an argument is, the texts do some hand waving to the effect that the conclusion is a "claim" based on "reasons" given in the premises (but little is made of this subsequently, in many of the texts). The other point of view on argument, a sharply contrasting one, is the pragma-dialectical approach of Frans H. van Eemeren and Grootendorst[7] which emphasizes public commitments over personal beliefs, and sees an argument not as an internal, mentalistic process but as a rule-governed kind of discussion entered into by two or more parties in order to resolve a conflict of opinions. According to this much broader approach, an argument is more than just a set of propositions. It comprises many kinds of speech acts, evaluated in a goal-directed, normative model of dialogue.

Given these various points of view, which now seem to be on the brink of changing new developments in logic and the study of reasoning and argument generally, it is problematic to see how reasoning is related to argument. Are reasoning and argument essentially the same thing? Or is one a proper subpart of the other? Or can you have reasoning that is not in argument? Or could you have argument without reasoning? It seems hard to know where to begin replying to these questions.

[5] "Logic and Reasoning," *Synthese*, LX (1984): 107–127.
[6] "Reasoning and Logic," *Synthese*, LXXIX (1989): 99–117.
[7] *Speech Acts in Argumentative Discussions* (Dordrecht: Foris, 1984).

Certainly these questions have begun to bother those of us working in the area of informal logic and, from time to time, stabs at saying something useful have been made. Trudy Govier[8] has made a highly plausible characterization of the basic difference between argument and reasoning as follows.

> An argument is a publicly expressed tool of persuasion. Typically it takes thinking to construct an argument. Reasoning is distinguished from arguing along these lines: reasoning is what you may do before you argue, and your argument expresses some of your (best) reasoning. But much reasoning is done before and outside the context of argument (*ibid.*, p. 117).

The account given below will be in basic agreement with Govier in seeing reasoning as something that takes place in argument, and will portray argument as a social, interactive, goal-directed tool of persuasion. Many other things, as well as persuasion, will be central, however.

In the account of reasoning and argument now to be presented, reasoning will be defined as a kind of abstract structure, which can nevertheless be dynamic and interactive in some cases, as well as static and solitary in other cases. In this account, reasoning is characteristically used in argument, but it can be used in other pragmatic contexts as well.

I. WHAT IS REASONING?

In his *Dictionary of Philosophy,* Peter A. Angeles[9] defines *reasoning* in three ways.

> reasoning. 1. The process of inferring conclusions from statements. 2. The application of logic and/or abstract thought patterns in the solution of problems or the act of planning. 3. The ability to know some things without recourse directly to sense perceptions or immediate experience (*ibid.*, p. 240).

The second definition is not too helpful until we know how "logic and/or abstract thought patterns" are being defined or understood. For example, is formal logic or informal logic meant? The third definition is a negative one that excludes resource to sense perceptions. The restriction seems appropriate and instructive, but it does not offer a positive account of what reasoning is.

The first definition is positive, and does seem to capture the basic idea behind reasoning. The main problem with it is the use of the

[8] "Critical Thinking as Argument Analysis?" *Argumentation,* III (1989): 115–126.

[9] New York: Barnes & Noble, 1981.

term 'inferring'. Can this term be defined without presupposing our understanding of it as a kind of reasoning? Perhaps it can, if we define an *inference* as the use of a rule or warrant to link some propositions (statements) with others. The *conclusion* is the proposition toward which the inference moves. The *premises* are the beginning propositions from which the inference starts. Thus, an inference links the premises to the conclusion, and it always has a direction—proceeding from the premises to the conclusion.

Reasoning is primarily from propositions to propositions, but the conclusion of reasoning can also be an action. In such a case, however, the action is within an imperative that directs an agent to do something (or to abstain from doing something). This kind of imperative could also be described as a practical ought sentence of the form: "Agent, you ought to do such-and-such!" While, strictly speaking, not a proposition, this kind of sentence can behave somewhat like a proposition in practical reasoning, because it can follow from premises that describe an agent's goals and knowledge of his particular circumstances.[10] It is a practical ought sentence that expresses an imperative.

Another valuable feature of Angeles's definition of 'reasoning' is that it rightly states that reasoning needs to be understood within a context of use.

> Reasoning can be used for a variety of purposes: to deceive, to argue, to debate, to doubt, to persuade, to express, to explain, to apologize, to rationalize, etc. It seems that any form of conscious activity can be affected and structured by the reasoning process (*op. cit.*, p. 240).

Note that 'argument' and 'reasoning' are conceived here as different (nonequivalent) terms. Reasoning is used in argument. Reasoning can be used in different speech acts, or contexts of discourse.

Logical pragmatics could be conceived of as the study of the uses of reasoning in a context of discussion. But what, then, is logic? Is it the study of the abstract forms of reasoning exclusively, or can it comprise the uses of reasoning, as the emerging practices of so-called informal logic seem to suggest? One thing we can say is that in a critical discussion,[11] logical reasoning can be used where one party, in dialogue with another party, tries to convince this other party that his (the first party's) point of view is right. In this use of reasoning, the premises are concessions made by one party to the discussion, typically at the request of the other party. Conclusions are proposi-

[10] Cf. B. J. Diggs, "A Technical Ought," *Mind,* LXIX (1960): 301–317.
[11] Van Eemeren and Grootendorst, *op. cit.*

tions drawn from these premises by the warrants appropriate for the discussion, or agreed to by the participants.

Along these lines, then, it seems appropriate to offer an abstract definition of reasoning which, in order to be fully understood, needs to be placed in a pragmatic context of use. As a first pass, let us consider the following proposed definition.

Reasoning is the making or granting of assumptions called *premises* (starting points) and the process of moving toward conclusions (end points) from these assumptions by means of warrants. A *warrant* is a rule or frame that allows the move from one point to the next point in the sequence of reasoning. The term 'warrant',[12] used instead of the more familiar (but narrower) term 'rule', is appropriate because of the existence of frame-based, and other kinds of non-rule-based reasoning.

This definition appears to be comparable to the one given by Dagobert D. Runes[13] in his *Dictionary of Philosophy.*

> Reasoning is the process of inference; it is the process of passing from certain propositions already known or assumed to be true, to another truth distinct from them but following from them; it is a discourse or argument which infers one proposition from another, or from a group of others having some common elements between them (*ibid.*, p. 281).

The main difference between our definition (which is closer to Angeles's definition in this respect) and Runes's definition is that Runes defines reasoning as a discourse or argument, whereas we define reasoning as occurring within discourse or argument.

A valuable aspect of Runes's approach to defining 'reasoning' is the careful division of the definition into two parts or meanings. The part quoted above refers to reasoning *in logic.* Another quite different part defines reasoning *in psychology* as "the act or process of exercising the mind," referring to actual thought processes (*ibid.*, p. 280). By contrast, Runes sees the definition of reasoning in logic as being essentially normative in nature.

> It must be added that the logical study of reasoning is normative: logic does not analyze it simply in its natural development, but with a view to guide it towards coherence, validity or truth (*ibid.*, p. 281).

Reasoning can be studied from various points of view. Psychology, sociology, and other empirical sciences study the behavioral dynamics of how reasoning is actually carried out by individuals or

[12] Stephen Toulmin, *The Uses of Argument* (New York: Cambridge, 1969, 2nd ed.).

[13] Totowa, NJ: Rowman & Allanheld, 1984.

groups. To study the logic of reasoning implies a normative point of view whereby the reasoning is judged as weak or strong, good or bad, valid, fallacious, etc. With the rise of mathematical logic as a discipline, a sharp wedge was driven between the logical and the psychological points of view on studying reasoning. While there are overlapping concerns and interests, still it is important to see clearly that the logical point of view on reasoning is distinctively different from the psychological point of view.

From the logical, as opposed to the psychological point of view, *reasoning* can be defined generally as a sequence of steps from some points (premises) to other points (conclusions). Reasoning is sequential, and best modeled abstractly by a graph or argument diagram where arcs (steps) link points (vertices in the graph).[14] The points normally represent propositions, but they can represent the contents of other speech acts, like questions and imperative utterances, in some cases.

Reasoning can be linear, or it can have a tree structure, or it can even be circular in some cases (*ibid.*).

Reasoning normally has a direction. Most often, as already mentioned, it moves "forward" from the premise toward the conclusion. Directionality of reasoning depends, however, on how it is being used in a context of argument. There can be "backward" reasoning in some instances—for example in a kind of case where a conclusion is known and the reasons (premises) supporting the conclusion are sought out. Backtracking of this sort is not always reasoning, but it can be a kind of reasoning in some cases.

In the context of argumentation characteristic of "proving your point" in a critical discussion, reasoning goes forward from your opponent's premises to your own conclusion. Forward reasoning is generally characteristic of cases where reasoning has a *probative function,* that is, where the premises are being used to support the conclusion, or to prove it. The directed graph (digraph) is the model of directional reasoning.

Reasoning is normally directed, in a context of argument, toward some goal. But it need not always be. There can be aimless reasoning. When reasoning is used to fulfill a probative function, there is normally one particular proposition designated as the ultimate conclusion to be proved in the sequence of reasoning. This goal gives the sequence of reasoning its purpose. The reasoning should be judged as good, appropriate, erroneous, fallacious, etc., insofar as it supports the realization of this goal, or prevents it from being fulfilled.

[14] Walton and Lynn M. Batten, "Games, Graphs and Circular Arguments," *Logique et Analyse,* LVI (1984): 133–164.

II. KINDS OF REASONING

There are four especially important categories that define different kinds of reasoning.

1. Monolectical and dialectical reasoning: *dialectical (interactive) reasoning* occurs where there are two participants reasoning together, and the reasoning of each participant contains steps derived from the reasoning of the other. *Monolectical reasoning* is nondialectical, i.e., a single reasoner can function alone, requiring no input from another reasoner.
2. Alethic and epistemic reasoning: *alethic reasoning* is based only on truth values of propositions, whereas *epistemic (knowledge-based) reasoning* takes place in relation to a knowledge base. In knowledge-based reasoning, a reasoner can draw on a given set of premises that are known to be true.
3. Static and dynamic reasoning: in *static reasoning,* the set of given premises is fixed or designated, and cannot change. In *dynamic reasoning,* this set can change at each succeeding step in reasoning. Dynamic reasoning is relative to (open) changeable circumstances.
4. Practical and theoretical reasoning: *practical reasoning* is a kind of goal-directed reasoning that seeks out a prudential line of conduct for an agent in a particular situation.[15] *Theoretical (discursive) reasoning* seeks evidence that counts for or against the truth of a proposition. The primary characteristics of practical and theoretical reasoning are summarized below.

Theoretical reasoning is oriented to finding reasons for accepting a proposition as true or false. The problem is to decide whether a proposition is justified on the basis of what we know: *cognitive orientation.*	*Practical reasoning* is oriented to choosing a course of action on the basis of goals and knowledge of one's situation. The problem is to decide whether an action is practically reasonable or prudent: *practical orientation.*
Premises are assumptions that support, or fail to support, a conclusion to a particular extent. There are three standards of support: 1. deductive standards; 2. inductive standards; 3. plausible (opinion-based) standards.	Practical reasoning is characteristically based on uncertainty or incomplete knowledge of a particular (changing) situation. Premises describe goals and knowledge. The conclusion is an imperative.

[15] See G. E. M. Anscombe, *Intention* (New York: Blackwell, 1957); and G. H. von Wright, "On So Called Practical Inference," *Acta Sociologica,* XV (1972): 39–53.

Theoretical and practical reasoning are vehicles for solving different kinds of problems. Hence the methods used are different, even though overlapping. Practical reasoning characteristically arises in a situation that is a *practical conflict,* where, no matter what an agent does, he violates one or the other of his commitments. An example is the situation of Antigone who was committed by divine law to bury her slain brother Polyneices, but also committed as a citizen of Thebes to obey the king's order that no one was to bury Polyneices.

The comparable concept of theoretical reasoning is *logical inconsistency,* where there is a set of propositions that are logically inconsistent, meaning that it is not logically possible (i.e., semantically possible) for all to be true.

A final important distinction is that in all reasoning, there can be an open-world assumption or a closed-world assumption. The *closed-world assumption* means that the reasoning is treated as static, and the premises are regarded as exhaustive of all the evidence relevant to the conclusion. This assumption says: "This is all we need to know, and no further evidence will count as relevant." In any reasoning where the closed-world assumption does not obtain, then the *open-world assumption* obtains, meaning that there is the possibility of new information affecting the reasoning.

The open-world/closed-world distinction is crucial to evaluating lack-of-knowledge inferences, or arguments traditionally called *argumentum ad ignorantiam,* of the following type. Let A be a proposition.

(IG1) If A is not known to be true, then A is false.
(IG2) If A is not known to be false, then A is true.

In cases of reasoning where the closed-world assumption obtains, (IG1) and (IG2) are very strong (indeed, deductively valid) forms of reasoning. In cases where the open-world assumption obtains, (IG1) and (IG2) can be stronger or weaker, depending on the particular case. It follows that the *argumentum ad ignorantiam* is (a) not always fallacious, and (b) depends on features of the reasoning in a particular case as an argument that is stronger or weaker.

III. PRACTICAL REASONING

Practical reasoning is a kind of goal-directed reasoning based on two premises. One premise states that an agent has adopted a goal or intention. The other premise states that this agent knows that, relative to his given situation, there is an action that is a means to carry out the goal of the first premise. The conclusion of a practical inference states that the agent ought (practically) to carry out the action cited in the second premise.

Practical reasoning is a chaining together of the two basic schemes of practical inference represented below, where a is an agent, A is an action, and G is a goal.[16]

G is a goal for a.
Doing A is necessary for a to carry out G.
Therefore, a ought to do A.

G is a goal for a.
Doing A is sufficient for a to carry out G.
Therefore, a ought to do A.

The first type of practical inference is called the *necessary-condition scheme,* and the second type is called the *sufficient-condition scheme.* Practical reasoning is used in different contexts of argumentation, and may be judged as successful or correct in relation to the goals of these contexts.

One such context is planning. Planning arises when an agent is considering possible alternative future courses of action as ways of confronting a conflict of commitments or uncertainty on how to proceed in a situation where some action is called for.

The concept of a plan has achieved recognition in AI as a fundamental in script-based reasoning (reasoning based on common-sense knowledge of familiar types of situations). Robert Wilensky[17] has presented a plan-based theory of understanding as a tool for studying problem-solving and natural-language reasoning for AI. The special aspects of planning highlighted in Wilensky's study are multiple goal planning, resolution of goal conflicts, and the reasoned process of goal abandonment. The kind of goal-directed knowledge structure central to Wilensky's concept of planning is clearly a framework of systematic, intelligent deliberation which provides one important context for practical reasoning.

Another context of practical reasoning (often associated with or included in planning) is that of advice-giving dialogue where an expert in a skill or domain of knowledge is consulted in order to solve a problem. Generally, practical reasoning is best judged as argumentation within a framework or context of interactive argument as a shifting of a burden of proof from one participant to another.

For each argumentation scheme, of either of the two kinds of schemes above, there is a matching set of critical questions of the following kinds.

[16] See my *Practical Reasoning: Goal-Driven, Knowledge-Based, Action-Guiding Argumentation* (Savage, MD: Rowman & Littlefield, 1989), p. 48.

[17] *Planning and Understanding: A Computational Approach to Human Reasoning* (Reading, MA: Addison Wesley, 1983).

1. Are there alternative means of realizing G, other than A?
2. Is it possible for a to do A?
3. Does a have goals other than G, which have the potential to conflict with a's realizing G?
4. Are there negative side effects of a's bringing about A that ought to be taken into account?

If the two premises of a scheme are satisfied by a proponent, then a burden of proof is thrown onto a respondent who questions the conclusion based on these premises. The burden implies that the respondent should pose one or more of the appropriate critical questions above. If he does so, the burden is then shifted back onto the proponent to reply adequately to the question.

Practical reasoning is the vehicle whereby stated or formulated goals are linked as commitments to specific actions relative to the particular situation of an agent (as the agent sees the situation).[18] Practical reasoning is the chaining together of practical inferences, bringing together the commitments of an agent in relation to the agent's situation.

Thus, practical reasoning, in contrast to theoretical reasoning, is a feedback relationship between an intelligent agent (knowledge-base) interacting with its changing external circumstances in order to guide itself toward a goal.

IV. WHAT IS AN ARGUMENT?

In his *Dictionary of Philosophy,* Angeles gives a two-part definition of *argument.*

> argument (L., *arguere,* "to make clear"). **1.** The reasons (proof, evidence) offered in support or denial of something. **2.** In logic, a series of statements called *premises* logically related to a further statement called the *conclusion* (*op. cit.,* p. 18).

Part 2 of this definition falls back onto part 1, for presumably the *premises* are the "reasons (proof, evidence) offered in support or denial of" the *conclusion.* Offering a helpful definition of *argument* then requires an elucidation of what are reasons (proof, evidence) offered in support (or denial) of something.

Definition 1 above is the standard sort of definition of 'argument' given in logic textbooks. But there are variants of it. Irving Copi[19] requires only claims "which are regarded as providing support," rather than genuine reasons.

> An argument, in the logician's sense, is any group of propositions of which one is claimed to follow from the others, which are regarded as

[18] Cf. *Practical Reasoning.*

[19] *Introduction to Logic* (New York: Macmillan, 1986, 7th ed.), p. 6.

> providing support or grounds for the truth of that one. Of course, the word "argument" is often used in other senses, but in logic it has the sense just explained (*ibid.*, p. 6).

Claimed by whom? And regarded by whom? By the proponent of the argument, one would suppose.

With respect to Angeles's definition, do the reasons (proof, evidence) have to be good reasons? Or can there be bad or erroneous reasons offered in support of something? Can there be erroneous proof or wrong evidence offered in support of something, yet where, even so, that would be enough proof or evidence to call what was offered an argument? It would seem that a proponent of the Angeles definition should allow for these possibilities. Certainly, it should not follow from a definition of 'argument' that all arguments are good arguments, and that there are no bad arguments.

This brings us back to Copi's definition. What is meant by 'claimed' here, and 'regarded as providing support'? Evidently these phrases refer to a kind of stance or attitude taken up or conveyed by the proponent of the argument. To claim that a proposition is true and can be supported is to assert that proposition and commit oneself to its truth, implying a commitment to defending its truth, as alleged, against attacks or undermining of it by any potential opponent. In this sense, the term 'claim' tacitly presupposes an interactive (dialectical) framework of a proponent upholding a point of view and an opponent questioning that point of view. A claim is an upholding of some particular proposition that is potentially open to questioning.

Copi's definition, however, only goes part way toward the dialectical conception of an argument. In this regard, it is typical of the logician's use of the term 'argument' in logic texts and manuals since Aristotle, where there is the attempt to suppress the idea of an interactive context of discussion. The perceived need is to see the concept of argument as a purely objective notion that can be captured by the formal logic of propositions and truth values. In this standard approach, the dialectical meanings of the term 'claim' are suppressed, and never again mentioned.

Among those not corrupted by logic courses, however, the term 'argument' has a broader meaning. According to *Webster's New Twentieth Century Dictionary of the English Language,*[20] 'argument' is given three basic senses (disregarding the technical and obsolete senses also listed).

> är'gū-ment, *n.* [Fr. *argument;* L. *argumentum,* evidence, proof, from *arguere,* to make clear, prove.]

[20] New York: Rockville, 1965.

1. A reason offered for or against a proposition, opinion, or measure; a reason offered in proof, to induce belief, or convince the mind; as, the only *argument* used was force.

2. A debate or discussion; a series of reasoning; as, an *argument* was had before the court, in which *argument* all the reasons were urged.

3. The subject of a discourse or writing; in a more restricted meaning, an outline of the plot or a summary of any literary production; as, the *argument* of a play.

The abstract or *argument* of the piece is shortly as follows.

The first meaning is similar to the definitions of Angeles and Copi, except that it is broader, including the purposes of inducing belief or convincing the mind. These purposes appear to be psychological in nature, but could perhaps alternatively be construed as dialectical elements, i.e., a proponent having the purpose of convincing an opponent in an argumentative discussion.

But the dialectical aspect is explicitly expressed in the second meaning. According to this broader meaning, the argument is not identical to the reasons offered to support a conclusion. Rather, the reasons are advanced *in* the argument.

The third meaning also expresses a broad notion of argument. In this sense, an argument is not just a localized step of inferences, consisting of a small number of premises and a conclusion, connected by a single warrant. Instead, it is a long thread or fabric that runs through and holds together an extended discourse or argumentative text. In this sense, the argument could be expressed in a summary, but the full argument could have originally been a linked sequence of subarguments, ranging over an entire book for example.

The Webster's entry suggests a conception of argument that is much broader and richer than the truncated version of it partially expressed in the traditional logicians' definition. This broad notion is more like what van Eemeren and Grootendorst call *argumentation,* a goal-directed form of interactional (communicative) activities wherein two parties attempt to resolve a conflict of opinions (*op. cit.*, pp. 1–9). In the *simple critical discussion,* one party (the proponent) has the role of defending an expressed opinion (point of view), and the other party has the role of critically questioning that opinion.

Such a pragmatic perspective suggests a new way of defining 'argument' to make it coextensive with argumentation. The only difference between the two is one of connotation. 'Argumentation' refers to the global process of defending and criticizing a thesis (point of view) which spans the whole context of discussion. The term 'argument' can also have this meaning, but is often used for practical purposes to refer to a local segment of a chain of argument, com-

prising specifically designated premises and conclusions. According to this usage, the term 'argument' can be used in a restricted way somewhat reminiscent of the logicians' truncated definition. Accordingly, a new definition of 'argument' is now proposed.

Argument is a social and verbal means of trying to resolve, or at least to contend with, a conflict or difference that has arisen or exists between two (or more) parties. An argument necessarily involves a claim that is advanced by at least one of the parties. In an asymmetrical case, one party puts forward a claim, and the other party questions it. In a symmetrical case, each party has a claim that clashes with the other party's claim. The claim is very often an opinion, or claim that a view is right, but it need not be. In a negotiation argument, the claim could be to goods or to financial assets.

The conflict or difference (*stasis*) that is the origin of the argument could be of different kinds—it could be a conflict of opinions, an unsolved problem, an unproven hypothesis, or even a situation where both parties are blocked from further actions they are trying to carry out. The different kinds of argument are different ways of trying to resolve these conflicts.

One of the most familiar and important kinds of argument is the persuading- (or convincing-) oriented kind called the critical discussion by van Eemeren and Grootendorst. But there are other kinds as well.

V. ARGUMENT AND DIALOGUE

Reasoning normally occurs in a framework of use (pragmatic framework). Often, the framework of use is argument. Reasoning does not necessarily or always occur in argument, however. A participant can reason in a game of chess, for example, where the reasoning need not necessarily be in an argument. Or to take another example, reasoning can occur in offering or understanding an explanation, where the reasoning is not in an argument.

When reasoning occurs in a context of argument, we say, derivatively, that there are different kinds of reasoning. This way of speaking is perfectly intelligible and acceptable, but it should be realized that such differences are not intrinsic to the reasoning. Rather, they are different kinds of reasoning only in the derived sense that the reasoning is occurring in a different context of argument, meaning that it is being used differently.

Reasoning can be aimless, but argument is essentially goal-directed. And so when reasoning occurs in a context of argument, that reasoning is purposive. Just as reasoning occurs in argument, argument occurs in a larger context of activity. Most often, argument occurs in dialogue. When this happens, the reasoning in the argument can be called dialectical reasoning. Some say that all reasoning

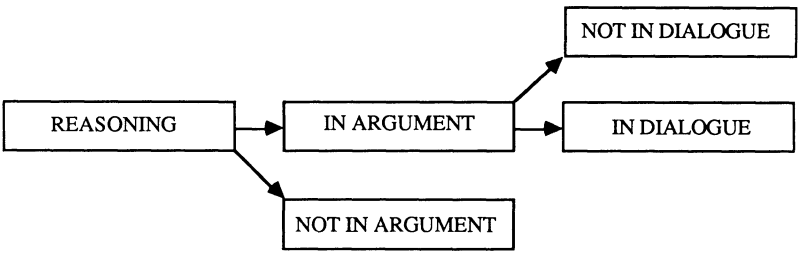

Figure 1: Containment relations

is dialectical, but it is more widely acceptable to say that some reasoning can be nondialectical, meaning that it can be a solitary rather than an interactive process. (See Figure 1.) The usual examples of nondialectical reasoning cited are activities like planning or problem solving. Even though they are often interactive activities, these contexts of reasoning can also (presumably) be solitary in some cases. Some think, however, that actions like planning or solving a problem on your own are really disguised forms of interactively reasoning with yourself, where the same person alternately plays the role of proponent and respondent. There is something in this approach, but it will not be argued for here.

At any rate, argument often occurs in dialogue, and to understand an argument, it is very often highly important to know something about the context of dialogue in which the argument has occurred.

There are many different kinds of dialogues.[21] Some kinds of dialogue are nonargumentative, but many are inherently argumentative in nature, some more so than others.[22] The critical discussion is inherently argumentative. It is a species of persuasion dialogue where each participant tries to show, by means of arguments directed to the other participants, that his (the first participant's) point of view is right.

The negotiation dialogue is argumentative in a different kind of way. In contrast to persuasion dialogue, negotiation is a form of interest-based bargaining where the goal is to "get the best deal." This type of dialogue is characterized by Christopher W. Moore[23] as

[21] See William C. Mann, "Dialogue Games: Conventions of Human Interaction," *Argumentation,* II (1988): 511–532, for a classification of types of dialogue. See also the classification given in my *Informal Logic: A Handbook for Critical Argumentation* (New York: Cambridge, 1989).

[22] A number of types of argumentative dialogue are being classified and studied in a current research project undertaken with Erik Krabbe at NIAS, to be published as a monograph, *Commitment in Dialogue.* The classification Krabbe and I have developed is somewhat different from that given in Table 1 below, but contains many of the same types of dialogue.

[23] *The Mediation Process: Practical Strategies for Resolving Conflict* (San Francisco: Jossey-Bass, 1986).

a kind of competitive argumentation where the arguers make concessions in order to try to maximize their own share of a set of goods that is not sufficient for all. The goal here is not to show that a proposition is true or right, based on evidence, as it is in a critical discussion.

The debate may initially appear to be a kind of critical discussion. While it does have some elements of the critical discussions, its objectives and rules are generally quite different. There are two primary participants involved in a debate, but their real goal is to persuade a third party (usually an audience or a judge). The debate can be rule-governed, but the rules are characteristically permissive, from a logical point of view, and allow for highly aggressive adversarial clashes. The way the audience or judge decides the outcome may, in typical cases, not reflect a high degree of rationality. A debate often takes place in an institutionalized context, for example, a congress or parliament. But the institutional rules of debate often tend

Table 1: Eight Types of Argumentative Dialogue

Type of Dialogue	Initial Situation	Goal	Benefits
1. Critical Discussion	Difference of Opinion	To Convince Other Party	Understand Positions Better
2. Debate	Adversarial Contest	Persuade Third Party	Clarification of Issue
3. Inquiry	Lacking Proof	Prove or Disprove Conjecture	Knowledge
4. Negotiation	Conflict of Interest	Maximize Gains	Settlement and Consensus
5. Planning Committee	Collective Action Required	Joint Plan or Decision	Airing of Objections
6. Pedagogical	Ignorance of One Party	Teaching and Learning	Spread of Knowledge
7. Quarrel	Personal Conflict	Hit Out Verbally	Venting of Emotions
8. Expert Consultation	Need for Expert Advice	Decision For Action	Second-hand Knowledge

to be very permissive in allowing emotional argumentation of questionable relevance.

The inquiry is an essentially *cumulative* type of dialogue, meaning that retraction of commitment is not generally permitted. The inquiry is a collaborative investigation that seeks to prove something, or alternatively to show that the existing evidence is insufficient to prove it. The inquiry is a hierarchical procedure of reasoning (similar to an Aristotelian demonstration) where the premises are supposed to be better known or established than the conclusion to be proved from them. By contrast, the persuasion dialogue has the less ambitious goal of trying to show that one opinion is more plausible than another on a subject of controversy or conflict of opinions. The inquiry tries to show whether the proposition in question should be considered part of established knowledge or not.

The planning committee type of dialogue resolves its differences of points of view by a discussion that ends in a vote, or similar way of proceeding. Although this type of dialogue often involves logical reasoning and persuasive debate, the outcome may simply be based on self-interest. Ideally, however, the conclusion reached through this type of dialogue should use practical reasoning by reaching agreement on common goals and on the best means to implement them.

In the planning committee type of dialogue, two or more participants have one or more goals they are trying to carry out in a particular situation, and they are considering alternative ways of realizing their goals. The problem is to mesh the goals with the known available means of carrying them out, relative to the given situation.

The pedagogical type of dialogue presumes that the teacher has access to knowledge, and that his role is to impart that knowledge to the student. This kind of dialogue shares some characteristic with the expert consultation. But in the latter type of dialogue, a layperson consults an expert in a skill or domain of knowledge in order to obtain advice on a decision or a problem. In the expert consultation, both parties have obligations. The layperson must ask clear and relevant questions. The expert must give clear and nontechnical replies that guide the layperson to an understanding of the subject needed to solve his problem.

The quarrel is a kind of argumentative combat where each participant tries to hit out verbally at the other. The quarrel is characterized by an almost total absence of logical reasoning and by heightened emotions.

VI. ARISTOTLE ON REASONING

As noted, the logicians' definition of argument usually found in logic textbooks originally sprang out of Aristotle's theory of the syllogism.

There is, however, another, much broader and more heterogeneous conception of argument (and reasoning) in Aristotle's *Topics, Rhetoric,* and *De Sophisticis Elenchis.* This conception has a lot in common with the framework proposed above.

Aristotle frequently uses 'reasoning' where we would use 'argument', and vice versa. For example, he writes about different kinds of reasoning where, in the above framework, it would be, strictly speaking, more appropriate to talk about different kinds of argument. But these apparent differences can be explained, given the presumption that, since reasoning occurs in argument, different kinds of argument context will result (derivatively) in different kinds of reasoning.

In the *Topics* (100a25), Aristotle defined reasoning (*syllogismos*) as "an argument (*logos*) in which, certain things being laid down, something other than these necessarily comes about through them." Aristotle identified four kinds or special contexts of reasoning, identified by the four different kinds of premises they have. Reasoning is a *demonstration* (*apodeixis*) when the premises are "true" and "primary" propositions established in a scientific discipline (100a28). Reasoning is *dialectical* (*dialectikos*) when it starts from opinions that are generally accepted (100a31). Reasoning is *contentious* (*eristikos*) when it starts from opinions that appear to be generally accepted, but are not (100b24). Reasoning is *misreasoning* (*paralogismoi*) when it starts from premises in a special science that are neither true nor primary (101a10). Aristotle's conception of reasoning clearly placed key importance on where the premises come from. For Aristotle, premises are not merely arbitrary or "designated" assumptions in reasoning.

Aristotle's definition of reasoning is narrow in two respects. By using the word 'necessarily', he restricts himself to deductive reasoning, ruling out the possibility of inductive or plausible reasoning. By using the phrase 'something other than', he restricts himself to noncircular reasoning, ruling out as reasoning the case where what "comes about" is not "other than" what is "laid down."

Dialectical reasoning is opinion-based reasoning in a context of argumentative dialogue on a controversial issue. Demonstration appears to correspond to how we in the twentieth century think of scientific investigation or inquiry. Or, at any rate, it corresponds to how the results of scientific investigation are presented and organized as established findings. Demonstration starts only from premises that can be established as "verified" or "known to be true" within a field of scientific knowledge.

Contentious reasoning or *eristic* is the degeneration of reasoned dialectic into verbal combat, or the purely adversarial quarrel. Curi-

ously, Aristotle also thought that demonstrative reasoning had a negative counterpart, misreasoning. What might he have meant by this? Perhaps it could correspond to the kind of pseudoscientific reasoning typified by the cases studied in Martin Gardner's *Fads and Fallacies in the Name of Science.*[24] At any rate, it appears to be highly significant to the study of informal fallacies generally that there might be different kinds or contexts of a fallacy, depending on whether the context of argument is that of demonstrative or dialectical reasoning.

Dilip K. Basu[25] thinks that the Aristotelian demonstration was not intended as a model of scientific investigation, but as a model of how a teacher should represent scientific knowledge to a student. According to this interpretation, the scientific tutor gets his premises from the field scientist, and then uses them to demonstrate conclusions in an orderly way. This fits Euclidean geometry (the paradigm of demonstration) very well. For the numbering of theorems in Euclidean geometry does not represent the order of discovery, but the tidied-up order of presentation of the proofs in a carefully organized sequence.

Galen (*circa* 129–199) wrote a major work on the demonstration called *De Demonstratione* (*Peri Apodeixeōs*), unfortunately lost some time after the sixth century. But in a short treatise, "On the Best Teaching," he argued for a "linear" or "geometrical" exposition of scientific knowledge in teaching, instead of freely allowing students to argue for both sides of a disputed issue. According to John Spangler Kieffer's introduction to Galen's *Institutio Logica,*[26] Galen thought that demonstration had a double role. Not only is demonstration useful for establishing scientific facts, but it can also be useful to refute errors and to defend science against the adherents of erroneous theories.

It seems, then, that the Aristotelian concept of a demonstration could be somewhat complex and ambiguous. It could refer to a context of reasoning as a kind of group investigation by a collection of peers who have the goal of proving or disproving some conjecture. This kind of inquiry would be typical of scientific research, but it need not be confined to purely scientific contexts. Other kinds of official or nonofficial inquiries could take place as well. But, second, the demonstration could also refer to the presentation of the results of an inquiry in the forms of teaching, published results, writing a report, etc. This might not be argument among peers, but could

[24] New York: Dover, 1965.
[25] "A Question of Begging," *Informal Logic,* VIII (1986): 19–26.
[26] Baltimore: Johns Hopkins, 1964.

rather be a form of advice given by experts (or those who have been privy to the inquiry) to those who are being instructed in the findings of the inquiry.

Thus, the apparent ambiguity found in the Aristotelian concept of the demonstration can be explained as a kind of shift from one context of dialogue to another. In one sense, the demonstration is simply an inquiry. But through dialectical shifts, 'demonstration' could refer to other more complex contexts of argument, where the results of an inquiry are presented to a new audience. This could take various forms of dialogue. One could be a context of advice-giving dialogue by expert consultation. Another could be the pedagogical context of teaching the results of the inquiry to students.

Without trying to interpret definitively what Aristotle really meant to say—a task best left to the specialists in Greek philosophy—it is interesting to see that there was an Aristotelian tradition of understanding argument and reasoning which is not that dissimilar in broad outline from the apparently radical framework proposed above. While our new definitions of these old terms may certainly seem radical from a viewpoint of established twentieth-century preconceptions in logic, they do not seem at all out of place in relation to general perspectives on argument and reasoning in ancient writings on argumentation, and notably in Aristotle.

VII. WHAT IS LOGIC?

It is a platitude that logic is the science of reasoning. But as a definition, this platitude is inadequate. For psychology is also a science of reasoning. As a definition, it is much better to say: *logic* is the study of how normative models of reasoning are used in different contexts of dialogue. The chief objective of logic should be to evaluate arguments in order to separate the good (strong, correct, valid) arguments from the bad (weak, erroneous, fallacious) arguments. To put this in the form of a new platitude, logic is the evaluation of reasoning in arguments.

The key to this new approach is that logic uses normative models of reasoning that is good for purposes of various kinds of arguments. From the point of view of logic, the science of reasoning should be the study of whether or not conclusions can be extracted correctly from premises (assumptions), once it is clear what these assumptions are in a context of argument. Logic has to do with defining the assumptions as well, or identifying them correctly, and with evaluating whether a putative conclusion can be correctly derived from a given set of premises.

As already noted, logical pragmatics is the study of the uses of logical reasoning in a context of argument.

Formal logic abstracts from the content of the premises and con-

clusion of an argument, calling them propositions. *Informal logic* must interpret the uses of these propositions as speech acts in a context of dialogue, seeing them as moves that incur or relinquish commitments, e.g., assertions, denials, retractions, questioning moves, etc.

Formal logic has to do with forms of argument (syntax) and truth values (semantics). At any rate, this is the traditional conception. Informal logic (or more broadly, argumentation, as a field) has to do with the uses of argumentation schemes in a context of dialogue, an essentially pragmatic undertaking.

But, as has so often appeared paradoxical, informal logic does have to do with abstract, normative models of reasonable argumentative dialogue, which do have a (dialectical) formal structure. Hence informal logic is partly formal! It has to do with formal games of dialogue. But it is also practical, i.e., nonformal, in some respects. The key to this apparent paradox is to be found in the distinction clearly drawn by Hamblin between the formal and the descriptive study of dialogues (*op. cit.*, p. 256).

Hence the strongly opposed current distinction between informal and formal logic is really an illusion, to a great extent. It is better to distinguish between the syntactic/semantic study of reasoning, on the one hand, and the pragmatic study of reasoning in arguments, on the other. The two studies, if they are to be useful to serve the primary goal of logic, should be regarded as inherently interdependent, and not opposed, as the current conventional wisdom seems to have it.

In the twentieth century, the pragmatics of the uses of arguments in dialogue has not been widely held to be of any serious importance, either as a useful tool of reasoning or as an object of serious or vigorous academic study. Although Aristotle founded the study of dialectical reasoning quite firmly in the *Topics* and *De Sophisticis Elenchis,* this area of study has never again been taken up seriously in a sustained manner. It has always remained at the fringes of logic, in the study of informal fallacies, in an unexplained and often primitive state. Only very recently has this long-dominant trend begun to reverse itself to some extent.

Logic in the Western world has long been dominated by Aristotle's syllogistic logic and, since the beginning of the twentieth century, by symbolic (mathematical) logic. In using these formal structures of deductive logic, it has been presumed that formal logic is the most important kind of logic, or perhaps the only important kind of logic, and that formal logic is the abstract study of certain kinds of relations—primarily, the deducibility relation characteristic of the de-

ductively valid type of argument. This conception of logic takes the point of view that, in the study of reasoning in logic, it does not matter where the premises come from—they are arbitrarily designated (given) propositions. The only thing that matters is the relation between the set of propositions called the premises, and the single proposition designated as the conclusion—and, in particular, the relationship between the truth values of these pairs. Reasoning has now become exclusively concerned with the question of how the conclusion necessarily comes about from the premises. It is no longer about how the premises were originally laid down.

This one-sided view of reasoning has had some peculiar results. Given the dominance of this view, it is no longer possible to see why or how arguing in a circle could be a fallacy. It is never possible to go from truth to falsehood if your conclusion is the very same proposition as your premise. True, you have not gone anywhere, and such a premise would seem useless as a starting point for some real reasoning.

Only recently has it become more apparent that a pragmatic approach is absolutely necessary in order to make sense of informal fallacies. What are fallacies? They are violations of rules of reasonable dialogue.[27] But over and above this, they are also deceptive tactics used unfairly in argument to defeat an adversary in dialogue. If the study of fallacies is to be part of logic, clearly logic can make no headway in working toward its primary goal unless the pragmatic study of the uses of reasoning in argument (informal logic) is included as a legitimate part of the subject.

Thus, in redefining logic, we need to go back to the Aristotelian roots of the subject, to expand the boundaries of the subject to include informal logic, and to give up some of the false oppositions between the informal and formal logic special-interest groups.

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[27] See van Eemeren and Grootendorst, *op. cit.*, p. 177; and my *Logical Dialogue-Games and Fallacies* (Lanham, MD: UP of America, 1984), p. 237.