Dale Jacquette
University of Bern

DEDUCTIVISM IN
FORMAL AND INFORMAL LOGIC

Abstract: Deductivism is explained and defended. The thesis holds that logic generally, both formal and informal, is primarily concerned with the normative distinction between good and bad reasoning, and interprets good reasoning as minimally deductively valid inference. If deductivism is true, then it follows that all fallacies of reasoning, including the so-called informal or rhetorical fallacies, are deductively invalid. Deductivism as an ideology nevertheless cuts across the distinction between formal and informal logic. To defend deductivism against potential counterexamples, it is necessary to show that common fallacies are reconstructible as deductively invalid inferences. The present essay undertakes the groundwork of such a defense by arguing that even inductive argumentation, including inductive fallacies, along with circular reasoning, can be interpreted deductively. A large selection of other informal fallacies are also reconstructed as explicit deductive invalidities following a pattern that can be used to bring other fallacies under the deductivist umbrella.

Keywords: argumentation, circular reasoning, deductive validity, deductivism, fallacy, formal and informal logic, inductive reasoning, informal (rhetorical) fallacy, philosophical logic, validity.

1. The Deductivist Thesis

Deductivism is the philosophical thesis that good reasoning in logic generally is minimally a matter of deductively valid inference. According to deductivism, formal logic is therefore the continuation of informal logic by more rigorous symbolic mathematical methods, while informal logic is the continuation of formal logic by non-symbolic nonmathematical means. As logicians generally agree, an inference is deductively valid if and only if it is logically impossible for its assumptions to be true and its conclusion false. If deductivism is correct, then what unites formal and informal logic is primarily:

- A common concern with the exact distinction between good and bad reasoning.
- The promotion of good reasoning, and the detection, diagnosis and prevention of bad reasoning, alternatively by formal or informal methods.

- The requirement that a principal factor in distinguishing good from bad reasoning is, respectively, inferential deductive validity or invalidity.
- More particularly, a shared perspective by which deductively valid inference is determined by a universal concept that can alternatively be formally or informally defined and applied.

Whether or not deductivism is in fact correct is understandably the focus of considerable philosophical dispute. Among the most revealing and hence most interesting test cases for deductivism is the analysis of the so-called informal or rhetorical fallacies. No sensible defender of deductivism suggests that every aspect of good reasoning boils down exclusively to deductive validity. The issue is rather whether all informal fallacies are deductively invalid. If even the informal fallacies are fallacies because they are deductively invalid, then that is enough for deductivism to avoid certain standard criticisms. If, on the contrary, there are informal fallacies that are deductively valid, implying that at least some fallacies do not represent species or specimens of bad reasoning because of deductive validity failure, and thus, further, that deductivism is accordingly false. A single deductively valid informal fallacy is sufficient as a fatal counterexample to deductivism. The challenge in trying to defend deductivism is to treat *all* recognized informal fallacies, showing plausibly by careful review that each one distributively involves a deductive invalidity of inferential reasoning. The trouble is that there are indefinitely many informal fallacies, each of which undoubtedly requires its own customized analysis. There may therefore be no such thing as a truly exhaustive survey of all the informal fallacies for purposes of detecting how each in its own peculiar way might fall afoul of the demands of deductively valid inference.[1]

2. Deductivism and Burden of Proof in Fallacy Theory

The argumentation situation between deductivism versus nondeductivism with reference especially to the informal fallacies is therefore the following. The best that deductivism can do, and consequently the most

---

[1] I first systematically explored deductivism as a philosophical response to the informal or rhetorical fallacies in Dale Jacquette, 'Deductivism and the Informal Fallacies' (Jacquette 2007b). This essay develops the position originally presented in my ancestral paper of the same title (Jacquette 2007a), in the *Proceedings of the Sixth Conference of the International Society for the Study of Argumentation* (ISSA), edited by Frans van Eemeren, J. Anthony Blair, Charles A. Willard, and Bart Garssen, from the Sixth International ISSA Conference, University of Amsterdam, Amsterdam, The Netherlands, June 27–30, 2006.

that can reasonably be expected of efforts to justify deductivism philoso-
phically, is that every informal fallacy that comes under scrutiny, including
all well-known and frequently cataloged informal fallacies, surrender posi-
tively to a reconstruction under which an inferential deductive invalidity
is exposed, with no recalcitrant counterexamples having come to light and
no effort to avoid informal fallacies that are potentially problematic to the
deductivist thesis. If deductivism succeeds at least to such a degree, then it
seems legitimate to conclude that deductivism provisionally makes a solid
though obviously not final or definitive claim for the truth of its proposition
that all and only good reasoning is, minimally, deductively valid inference.

Deductivism in that case effectively shifts the burden of proof to nonde-
ductivism to disprove the deductivist thesis, either by delivering its mortal
counterexample in the form of a deductively valid informal fallacy, or by
showing that there are instances of other types of informal reasoning that
are correct despite being deductively invalid. Unless or until such a refuta-
tion of deductivism is forthcoming, it can then be said that deductivism,
while clearly not defeasible, is at least the leading contender and currently
undefeated master of the field, with no serious obstacles to its continued
acceptability appearing on the horizon. If this partial proof and redistri-
bution of argumentative burden can be achieved, then at the very least
deductivism will have established itself as a strongly viable alternative to
nondeductivism, and probably something more. The demonstration would
then allow deductivism, in lieu of credible counterexamples, to emerge as
the dominant force in philosophical logic, albeit looking over its shoulder all
the time in the event of the discovery of a deductively valid informal fallacy
or of informally correct albeit deductively invalid reasoning.

The importance of such a gain in theoretical systematization and simpli-
fication in philosophical logic cannot be overstated. The precise meaning of
such a qualified defense of deductivism should be carefully explicated. What
would it show, and what would it not show? To begin, what would most
definitely not be established by this strategy in support of deductivism is
that formal logic is necessarily to be preferred over and above informal logic.
Informal logic, treating the logic of good and bad reasoning almost entirely
by non-symbolic nonmathematical methods in stylized natural language, is
completed untouched by the deductivism–nondeductivism controversy. One
can alternatively be either a self-respecting deductivist or nondeductivist in-
formal logician, although there is evidently no prospect for the same sort of
parallel liaison between formal logic and nondeductivism. Still, the fact that
deductivism versus nondeductivism cuts across at least the informal side of
the formal-informal logic divide indicates that informal logicians need not

be hostile to deductivism, that they are fully at liberty to be philosophically open-minded about whether or not deductivism is true, both generally and more specifically as it relates to the proper diagnosis and advice for avoiding the informal fallacies of logical reasoning in all its applications.

3. Deductivism and Formal-Informal Logic

On a positive note, even the sort of qualified justification of deductivism that we have described has interesting further ramifications. The most significant dividend is undoubtedly the identification of a vital common ground between formal and informal logic. Deductivism, as emphasized, by no means collapses informal into formal logic. The informal logician is as much entitled to embrace deductivism as the formal logician is ideologically obligated to do.[2]

The longstanding problem of the relation between formal and informal logic is thereby solved at least in large part. For if deductivism is true and formal and informal logic alike are dedicated in their distinctive ways to good reasoning, among other things, as generally deductively valid, and bad or fallacious reasoning in particular, again, among other things, as generally deductively invalid, then logic in the most general sense can be properly understood as the normative study of reasoning, where good and bad reasoning are distinguished in turn both in formal and informal modes as depending on whether or not a corresponding logical inference is deductively valid. Formal and informal logic are not then such entirely different creatures; they are rather different approaches ranged along a continuum of logical methods, directed toward the same purpose of promoting deductively valid reasoning and exposing, analyzing, and guiding thinkers in resisting the deceptive charms of deductively invalid reasoning.

There is but one logic, then, whose gold standard is deductive validity, with purely formal and purely informal logical methods appearing at the extremes of a spectrum of ways of understanding the deductive validity status of inference. The model thereby also makes good intuitive sense of the otherwise inexplicable fact that what is called informal logic, as taught, for example, in critical reasoning courses, often contains explicitly formal devi-

---

[2] The view I offer of the connections, mutual dependence, and potential for fruitful interaction between formal and informal logic is a special application of my consideration of these topics in Jacquette, 'On the Relation of Informal to Symbolic Logic' (Jacquette 2007c).

ces. These generally include the partly symbolic theory of Aristotelian categorical syllogisms, involving such logical forms as A, E, I, O propositions and their formal combinatorial possibilities within the formal constraints of the classical three term three proposition syllogism, formally arranged for visual display in the traditional Aristotelian square of opposition, Venn, Euler or Lewis Carroll diagramming, and Beardsley argument diagramming, among other formal logical devices. The model additionally helps to explain the fact that what is called formal logic is never strictly formal, but involves informal explanations, minimally at the metalogical level, of formal logical terms and operators, of the intuitive meanings even of formal truth value and set theoretical semantics. Finally, the proposal accounts for the pre-symbolic preparation of propositions and arguments for purposes of symbolic translation and analysis by decision algorithms in what is professionally identified and standardly taught as formal logic, along with derivation of deductively valid inferences by axiomatic or natural deduction proof structures and formally deductively valid inference rules.

Formal and informal logic overlap significantly and grade off almost insensibly into one another. Each has elements that are essential to and traditionally associated with the successful pursuit of the other. This evident aspect of formal and informal logic, properly so-called, is unintelligible if formal and informal logic are fundamentally different logics with no greater shared concern than a general interest in the nature of logical thinking and the distinction between good and bad reasoning, with no further specification as to what constitutes the difference. Since questions of deductive validity and invalidity can in principle be handled either formally or informally, deductivism in this fashion ideologically bridges the formal-informal logic gap.

4. Formal and Informal Logical Methods in Deductivist Service

How, then, is formal logic to be distinguished from informal logic, if not on grounds that only formal logic is primarily concerned with deductive validity and invalidity? A useful recommendation is to distinguish between formal and informal logic by applying the arguably less controversial because criteriologically more sharply defined distinction between specialized symbolic versus non-specialized non-symbolic logic. More generally, it seems appropriate to suggest that a logical theory or procedure is formal if and only if it adopts a specialized symbolism for representing logical forms that does not occur in ordinary non-specialized non-symbolic thought and language.

Although all of logic has to do with logical form, we need not agree that all expressions of logical form must themselves be formal. This distinction captures much of the received concept, since it includes all of symbolic logic and excludes non-symbolic evaluations of validity or invalidity. As we might expect, formal logic by the proposed distinction will roughly include everything belonging to what has become the *de facto* criterion for formal logic in relations expressed by means of standard and nonstandard notational variations and extensions of the propositional and predicate-quantificational calculus. The definition additionally includes schematic and graphic treatments of syllogistic logic that have traditionally been regarded as belonging more properly under the aegis of informal logic and critical reasoning. Informal logic, in contrast, on the present proposal, is limited to the consideration of a proposition's or argument's logical form by discursive reconstruction within natural language, the use of counterexamples to discredit inferences, identification of arguments as committing any of the so-called rhetorical fallacies, and the like.

The relegation of syllogistic logic, square of opposition, and argument diagramming methods to the genus of informal logic can now be seen as a kind of historical accident. Were it not for the emergence of more powerful algebraic methods of formal logic with the development of mathematical techniques in Frege's *Begriffsschrift* and C. S. Peirce's proto-quantificational logic, there is little doubt that the logic of syllogisms, Venn and other styles of diagramming, would constitute the whole of formal logic as opposed to purely informal non-specialized non-symbolic and extra-mathematical logical methods. Logic would then have remained today just as it was in the late eighteenth century, when Immanuel Kant was able to declare that no significant advances had been made since the time of Aristotle.[3] Why, then, should such logical tools be displaced as informal given the development of contemporary algebraic and rigorously algorithmic methods of mathematical logic?

On the present proposal, it is more appropriate to classify syllogisms and logical techniques that have standardly been turned over to the informal

---

[3] Immanuel Kant, *Critique of Pure Reason* [1787], translated by Norman Kemp Smith (New York: St. Martin's Press, 1965), Bviii: 'That logic has already, from the earliest times, proceeded upon this sure path is evidenced by the fact that since Aristotle it has not required to retrace a single step, unless, indeed, we care to count as improvements the removal of certain needless subtleties or the clearer exposition of its recognised teaching, features which concern the elegance rather than the certainty of the science. It is remarkable also that to the present day this logic has not been able to advance a single step, and is thus to all appearance a closed and complete body of doctrine'.

logic and critical reasoning textbooks as less powerful, general, and technically advanced, but every bit as *formal* as symbolic mathematical logics. As a consequence, it seems advisable to include Aristotelian syllogistic and all related graphic and diagramming paraphernalia as part of genuinely formal logic. We may thereby be committed to saying that these methods are properly part of formal logic despite their usually being included in what are called informal logic texts as adjuncts to the standard but misleadingly denominated informal logic curriculum. If so, then it may be time for logicians to admit that insofar as they use syllogistic logic and argument diagramming they are doing formal logic, despite falling under the deceptive rubric of informal logic. It may equally be time in that case for formal logicians to admit that there are weaker less universal methods of logic that are just as formal as the algebraic methods of formal symbolic logic, which they may prefer to use, but which do not for that reason alone have exclusive title to the category of formal logic.

There are many ways in which formal and informal logic interact. There are situations in which formal and informal logic can profitably cooperate in order to critically evaluate arguments. Formal symbolic logics are always accompanied by and presented within a discursive framework of informal metalanguage introductions and explanations, or can be traced back through a genealogy of formal conventions to an informal context. Without grounding in ordinary language and a relation to informal ideas, even the formalisms most familiar to practicing logicians lack meaning and application. If symbolic logic is not always needed, if it can be an impediment to understanding, and if it cannot function effectively entirely on its own for theoretical purposes in the explication of logical connections and deductive proof of consequences, then the use of specialized formalisms must be justified by a sufficiently powerful and comprehensive philosophical rationale. Informal logic is useful and often essential in working through a preliminary heuristic analysis of a problem before it can be decided whether and if so what kind of formal logic to apply in modeling a given choice of logical relations or in solving a logical problem. Sometimes informal methods provide a better, easier, or more understandable conceptual analysis of the logic of a proposition or argument, where there is no need to get out the heavy artillery.

Accordingly, we should now consider a pragmatic principle that allows informal and formal logical methods to be used individually or in combination to achieve the best analysis of the logic of arguments as determined situationally by their specific features and requirements. The ideal is for logicians to cultivate proficiency in as many formal and informal logical

methods as are available, not excluding efforts to discover or invent new techniques as each task may demand. The exigencies of every analytic task should accordingly then be considered independently on its own terms as a challenge for logical investigation in its own right.

5. Informal Fallacies as a Test Case for Deductivism

We illustrate the ecumenical deductivist approach to the entrenched division between formal and informal logic by turning now to the logical analysis of the so-called informal or rhetorical fallacies. One and all of these deductivism maintains in distinctive ways are deductively invalid.

More importantly, the most reasonable, complete and charitable reconstructions of these species and specimens of the informal fallacies are instructive with respect to the individual character of each distinct informal fallacy. If deductivism is true, then reconstructions of the informal fallacies as deductive invalidities are possible in every case. This means in turn that in every case the informal fallacies should also theoretically be formalizable in a sufficiently expressively comprehensive formal symbolic deductive logic.

If deductivism is true, and if deductivism is further interpreted formally as positive conformity with the requirements of deductively valid inference, then any species or specimen of reasoning that upon the most complete charitable reconstruction does not conform to such a deductively valid form will automatically be fallacious. If deductivism is true, then all fallacies, once again, on the most complete and charitable reconstruction, are first and foremost logical fallacies involving a deductive invalidity. Such fallacies can sometimes be collected together into more general categories, including but by no means limited to '*ad hominem*', '*ad ignorantiam*', '*ad vericundiam*', 'slippery slope'. In other cases, fallacious reasoning is so distinctive in content and specific in application as to deserve a descriptive name, as we find especially in the case, among numerous others, of 'the open question fallacy', 'the naturalistic fallacy', 'the intensional fallacy', 'the intentional fallacy', and 'gambler's fallacy'. If deductivism is true, then it is appropriate to speak of these fallacies as 'informal' only in contrast with such blatantly 'logical' fallacies as affirming the consequent or denying the antecedent. In fact, however, if deductivism is true, all fallacies are deductive invalidities, even when they are also something more. If deductivism is true, then all fallacies of reasoning are most reasonably, completely and charitably reconstructible as deductive invalidities.

The logical analysis of a fallacy takes some work, which is easily lost sight of when the analysis is presented in its most economical expression. The complete logical analysis of each specific fallacy poses unique problems of its own, but this fact does not contradict the proposition that all fallacies might yet be guilty of an underlying deductive invalidity. The argument requires a more precise statement of what is meant by a fallacy, and it is in the effort to clarify the concept of a fallacy that the real value of the exercise consists.

We begin by remarking that a *fallacy* is any logically incorrect argument. Informal logicians often further describe a fallacy as an incorrect argument that can look to be correct, or that can easily be mistaken for one that is correct, and that is potentially persuasive, unless we successfully challenge it, despite its logical failures. Human gullibility being what it is, however, absolutely any argument can be found persuasive regardless of its logical merits or liabilities. An adequate understanding of the concept of a fallacy as a result should not be based on its ability to deceive, but rather on its *logical* failures, however formally or informally considered. It follows that if we want to understand the concept of a fallacy, then we must arrive at a defensible theory of what distinguishes logically correct from logically incorrect reasoning. Persuasive many a fallacy of reasoning may be, but the concept of a fallacy is not exhausted by its persuasiveness. Our best arguments are not always sufficiently persuasive, as we know from Socrates' courtroom defense. A fully rational thinker should always want to work toward or otherwise support and hold open the hope that many of the best arguments will eventually prevail against bad reasoning, even against such fallacies as pack a punch with real, direct and meaningful practical consequences for health and happiness, such as the *ad baculum*.

6. Classical Fallacies and the Deductivist Reduction

There is no universal method of classifying fallacies. Logicians have resorted to devising taxonomies that try to make sense of as they comprehend as many of the recognized fallacies as possible. Logicians disagree about how to arrange fallacies into categories, and there are advantages and disadvantages in all of their proposals. They also sometimes even disagree about whether all of the traditionally recognized types really are genuine fallacies, and, for that matter, about what exactly is or should be meant by the concept of a fallacy.

Here, despite lack of unanimity in the field, is a relatively standard taxonomy of fallacies. Some have been discussed since ancient times, and are identified by classical Latin or Greek terms as well as more contemporary names. In the standard schema, fallacies of validity or *non sequiturs* are distinguished from fallacies of soundness, truth or credibility, and also from fallacies of significance. This division tracks a common definition of a good argument as one that is deductively valid, sound (containing only true assumptions), and significant (relevant and non-circular, among other catch-all virtues). This is a good method of explaining the features looked for in a good argument, to be associated with distinct categories of logical fallacies, including the informal or rhetorical fallacies usually taught in courses on critical reasoning.[4]

Taxonomy of Logical Fallacies

I. Fallacies of Validity (*non sequiturs*)
    A. Formal
        1. Deductive
            Invalid inference
                Denying the antecedent
                Affirming the consequent
            Fallacy of equivocation
                Four terms fallacy
            Naturalist (is-ought) fallacy
            Intensionalist fallacy
                Use-mention confusion

---

[4] Standard treatments of the informal or rhetorical fallacies are to be found in almost any competent introductory informal logic or critical reasoning textbook, and in a variety of more systematic theoretical works in the field. Beyond the usual suspects, see, especially, C. L. Hamblin, *Fallacies* (Studies in Critical Thinking) (Newport News: Vale Press, 1970). Frans H. van Eemeren and Rob Grootendorst, *Argumentation, Communication, and Fallacies: A Pragma-Dialectical Perspective* (Philadelphia: Lawrence Erlbaum Associates, 1992). Morris Engel, *With Good Reason: An Introduction to Informal Fallacies*, 5th edition (New York: St. Martin's Press, 1994). Robert J. Gula, *Nonsense: A Handbook of Logical Fallacies* (Mount Jackson: Axios Press, 2002). Christopher W. Tindale, *Fallacies and Argument Appraisal* (Cambridge: Cambridge University Press, 2007). A whimsical treatment is offered by Aaron Larsen and Joelle Hodge, *The Art of Argument: An Introduction to the Informal Fallacies* (Camp Hill: Classical Academic Press, 2006). A useful recent collection of essays on the subject is compiled by Hans V. Hansen and Robert C. Pinto, editors, *Fallacies: Classical and Contemorary Readings* (University Park: The Pennsylvania State University Press, 1995). I have been especially influenced by John Woods and Douglas Walton, *Fallacies: Selected Papers 1972–1982 with a Foreword by Dale Jacquette* (London: King's College Publications, 2007). See my Foreword to this collection, titled, 'Reasoning Awry: An Introduction to Woods and Walton, *Fallacies: Selected Papers 1972–1982*' (Jacquette 2007d).

      2. Inductive
         Hasty generalization
            Insufficient or unrepresentative data
               Cause-effect confusion
               Post hoc propter hoc
         Gambler's fallacy
   B. Informal or Rhetorical
      1. Deductive
         Ad hominem
            Tu quoque
            Poisoning the well
         Appeal to authority (*argumentum ad verecundium*)
         Appeal to majority (*argumentum ad populum*)
         Appeal to ignorance (*argumentum ad ignorantiam*)
         Appeal to emotion (*argumentum as misericordiam*)
         Appeal to force (*argumentum ad baculum*)
      2. Inductive
         False analogy
         Slippery slope (*sorites*)
         Guilt by association
            Genetic fallacy
II. Fallacies of Soundness (truth or credibility)
         Contradiction
         False alternatives
         Fallacy of composition
         Fallacy of division
III. Fallacies of Significance (irrelevance or circularity)
         Irrelevant conclusion (*ignoratio elenchi*)
            Straw man
            Diversion (red herring)
         Circularity (begging the question, *petitio principii*)
            Complex question (many questions)

Such a division evidently contradicts the radical version of deductivism now being defended. It does not affect weaker forms of deductivism that choose merely to emphasize a concern with deductively valid or invalid logical structures as a preoccupation of both formal and informal logic. We have nevertheless been aiming at something more enterprising in the thesis that all logical fallacies are matters of deductive invalidity. Thus, we also have a bit more explaining to do where some of the traditional fallacies are concerned.

Our strategy will be first to address those fallacies that seem most opposed to deductivism in the strong sense according to which all fallacies are deductive invalidities. If deductivism is true, then paradigm fallacies must include the deductively invalid inferences known as affirming the consequent and denying the antecedent. In these instances, it is obvious by informal methods such as imagining a scenario in which the assumptions are true and the conclusions false, as well as being confirmable by formal decision procedures such as truth table or truth tree analysis, that it is deductively invalid to infer P from the assumptions that if P then Q, and Q, or to infer Q from the assumptions that if P then Q and not-P. When we try to evaluate these obvious examples of deductively invalid inference, however, they do not seem at all to bear positive comparison with inductive fallacies or the so-called fallacy of circular reasoning, begging the question, or *petitio principii*.

6.1. Inductive Reasoning

What shall we say about such apparent counterexamples to deductivism? The inductive fallacies, such as hasty generalization, *post hoc propter hoc*, and the like, are bad enough, but the situation is compounded by the fact that according to deductivism all good reasoning is supposed to be deductively valid, whereas there are perfectly acceptable non-fallacious instances of inductive reasoning adopted for scientific purposes and deemed correct by philosophers and inductive logicians, that are apparently deductively invalid. From the fact that a sampling of objects or events has revealed a recurrent pattern of constant conjunction, even if exceptionless and highly confirmed experientially, it does not follow with deductive validity that therefore another or future object or event of the relevant kind will also display the same pattern of properties. It is logically possible in every instance of inductive reasoning, in the sense of the complete and correct description of the situation containing no logical contradictions, for all prior evidence, such as all previously observed swans being white, to indicate with only a high degree of probability rather than deductive certainty that the next encountered swan will also be white; it is possible, in other words, that not all swans are white and even that the next swan to be observed will not be white. We nevertheless consider many inductive inferences to be correct, useful and reliable, despite the fact that they appear one and all to be deductively invalid.

Despite the intuitive force of this first proposed counterexample to deductivism, it is possible, as Wilfrid Sellars has also shown, to reduce inductive inferences to deductive inferences involving the same probabilistically

qualified propositions taken as probably (to some definite degree) true assumptions, and, together with a choice of probability principles such as the Bayesian formula, *deduced* as probably (to some definite degree) true conclusions.[5] Thus, instead of construing an inductive inference as P, Q therefore-probably R, we can read it instead as Probably-P, Probably-Q, if probably-P and probably-Q then probably-R, therefore probably-R. If we build probability values into the statement of the evidence itself on which an inductive inference is based, and into the statement of the conclusion, together with a commitment to an appropriate inductive law, of which there are several from which to choose, relating evidence to conclusions, then in the case of properly chosen inductive laws, Bayes's theorem or the like, as each case demands, our inductive reasoning can be correct precisely because the inference is deductively valid. In every other instance, an argument will constitute a faulty inductive inference, in fact, an inductive fallacy, precisely because the inference is deductively invalid, just as deductivism implies.

6.2. *Post hoc, ergo propter hoc*

The case of *post hoc propter hoc* is instructive in this regard. Here and throughout, the short horizontal line serves as an inference indicator, dividing an inference's assumptions appearing above the line from its conclusion, below. The fallacy, schematically speaking, states:

1. Event E1 happened before event E2.
2. [Assuming true probabilistic laws L1-LN.]

---

3. Event E2 happened because of event E1.

This type of reasoning is commonly described as an inductive fallacy, but it is clearly an instance of deductive invalidity. It is always logically possible that an event occurs before another event but is not designated as a cause of the later event, regardless of the truth of the background probabilistic laws that the fallacious reasoning might try to invoke.

---

5 Wilfrid Sellars, 'Are There Non-Deductive Logics?', edited by Nicholas Rescher on behalf of the editorial committee, *Essays in Honor of Carl G. Hempel: A Tribute on the Occasion of his Sixty-Fifth Birthday,* Synthese Library (Boston – Dordrecht: D. Reidel Publishing Co., 1970), pp. 83–103. The same reductive principle by which inductive reasoning can be interpreted as deductive argument at Sellars' later philosophical home is undoubtedly responsible for the legendary slogan circulating in the halls and seminar rooms at the University of Pittsburgh that 'An inference is either deductive or defective'.

6.3. *Gambler's Fallacy*

As a final inductive fallacy in this category, consider the so-called *gambler's fallacy.* This is the fallacy of supposing that an established pattern of occurrences of a probabilistically random series of events implies that a present or future event of the same type will have a nonrandom, significantly higher or lower probability, because or by virtue of the chance patterns of past occurrences.

The fallacy has this inductively invalid logical form:

1. Inductively random events E1-EM of type or with property F have occurred in the past with probability P.
2. [Assuming true probabilistic laws L1-LN.]

3. Event EN of type or with property F will probably occur in the present or future with probability significantly different (higher or lower) than P.

The name 'gambler's fallacy' is appropriate to this common gambling superstition. When a series of random events like the ball spinning on a fair roulette wheel lands in red or black compartments in a particular pattern, it is tempting to believe that there is a greater likelihood for the next random event in the sequence will be red, or, on the contrary, that it will be black. Yet if the events are truly probabilistically random, as the assumptions state, then it is a fallacy to conclude from a long-running sequence of reds that the next spin of the wheel will also be red, or on the contrary that it is therefore more likely to change on the next spin to landing on black.

There is simply no predicting one occurrence or the other as having greater or lesser probability. If the events in question are inductively random, and if there are just two possible outcomes for each event, in this instance, to fall red or black, then the *a priori* probability that the next occurrence will be red is precisely the same as the *a priori* probability that the next occurrence will be black, namely, .5. From the fact that there has been a long run of reds there is no predicting that the next turn will also probably be red, nor that because the reds have gone on for so long that the wheel is probably due for a change and the next turn will probably be black. Each turn of an honest roulette wheel has precisely the same probability, and the entire sequence of turns has no predictability whatsoever, but by hypothesis is inductively random. What is important for the defense of deductivism in the present context is to notice that the gambler's fallacy is a fallacy because it represents a deductively invalid inference in which it is logically possible for all of the assumptions to be true and yet for the conclusion to be

false, even though a specified measure of probability is built both into the assumptions and conclusion and the relevant background laws of probability are assumed to be true.

6.4. Circular Reasoning, *Petitio principii*

An even more obvious putative counterexample to deductivism would appear to be circular reasoning or *petitio principii.* Here, in its simplest and most transparent form, circular reasoning attempts to infer that P from the assumption that P. Inferring the truth of P from P itself, however, is evidently deductively valid.

Whatever other reasoning offenses a subject may have committed in concluding that God exists from the assumption that God exists, the thinker can hardly be accused of deductively invalid reasoning. If circular inference is a fallacy, then it appears to be an informal or rhetorical fallacy of relevance rather than of deductive validity, as identified by the traditional classification of informal fallacies, and hence an example of fallacious but deductively valid reasoning.

There are two possibilities for defending deductivism against the alleged counterexample involving circular reasoning. The first is to argue that circular reasoning is not fallacious in the true sense of the word, but objectionable and to be avoided in argumentation for another reason. It might be said in this vein that *petitio principii* is generally lacking in significance, but is not for that reason alone fallacious. Another example is that of an inference that is in every way logically circumspect, formally and informally, but in any case deductively, but that involves, without equivocation in any of its terms appearing in any of its assumptions or conclusion, a concept that simply lacks relevant application. Thus, it is not a *fallacy*, properly so-called, if a thinker argues that God exists, meaning by 'God' her (existent) dog. The reasoner in that instance has not violated any principle of logic, formal, informal or rhetorical. The argument might and perhaps should be judged logically correct in every way, despite lacking significance for those who have something different in mind when considering a demonstration of the existence of God. If such a strategy can be sustained, then there is an immediate answer also for the supposed circular reasoning or *petitio principii* counterexample to deductivism, where significance for another reason is also conspicuously lacking in an otherwise logically correct and undeniably deductively valid argument.

The second method of defending deductivism against similar counterexamples is to allow that circular reasoning is fallacious, but that, properly expanded, it is also deductively invalid, and, as such, more grist for the

deductivist mill. We might accordingly represent the full context of circular reasoning in something like the following fashion:

1. P

   _____

2. It is significant (worthwhile, informative) to conclude that P.

If this is the actual intent of a given instance of circular reasoning, whether known or recognized as such by the reasoner or not, then the argument is evidently deductively invalid and properly designated as a fallacy under the deductivist reduction of all fallacies to deductive invalidities. For in all such cases it is logically possible for the assumption to be true and the conclusion false. The same lack of significance need not plague logically more complex deductively valid inferences, such as *modus ponendo ponens* or *tollendo tollens*, *reductio ad absurdum*, or the like, if these inferences are considered as issuing in worthwhile or informative conclusions. It may be an informal rather than formal matter to judge the relevance of the conclusions in question, regardless of the degree of inferential simplicity or complexity at stake, but it is a lemma of deductivism in any event not to preclude informal logic from its applications.

We see that there are at least two directions from which deductivism can be defended against circularity counterexamples. It is open to the deductivist to deny that *petitio principii* is a formal or informal logical fallacy in the first place, or to hold on the contrary that it is a fallacy precisely because it does after all involve a deductive invalidity when the circularity is more completely expanded upon reconstruction as an instance in which the thinker falsely supposes that it is significant, worthwhile or informative to conclude that a certain proposition is true from an assumption base that includes the very same true or false proposition. We turn then from inductive inference and circular reasoning to a representative selection of some of the more notable informal or rhetorical fallacies in defense of deductivism.

6.5. Equivocation and *Four Terms Fallacy*

A frequently encountered classical fallacy that embodies deductively logically invalid reasoning in a more subtle disguise is the so-called *fallacy of equivocation.* The same word or phrase can sometimes have different meanings in different sentences or linguistic contexts. If a term occurs with one meaning in the assumptions of an argument, but with another meaning in its conclusions, then the conclusions need not deductively follow from the assumptions, but might be false even when the assumptions are true.

The fallacy of equivocation can have several schematic forms, depending on where the equivocal terms appear. For a given equivocal subject term 'T' that admits of two (or more) distinct meanings or senses, any of the following conclusions are deductively invalidly derived from hypothetically true assumptions:

$T_{sense-1}$ has property F
$T_{sense-2}$ has property G

$T_{sense-1}$ has property G
$T_{sense-2}$ has property F
Something with property F has property G

Alternatively, it can also be the predicate terms that are equivocal in the logical fallacy of equivocation, as in the following example:

T has property $F_{sense-1}$.
If T has property $F_{sense-2}$, then T has property G.

T has property G.

The obvious point is that where there is equivocation or plural meanings involved in an inference, the truth of the assumptions of an argument does not deductively guarantee the truth of the conclusions. Arguments guilty of the fallacy of equivocation are therefore deductively logically fallacious.

In syllogistic logic, where classical categorical syllogisms contain exactly three terms, major, minor, and middle, the fallacy of equivocation, which in effect introduces another term by giving different meanings to at least two of the three required terms, is also known as the *four terms fallacy*. An example is this variation of a standard syllogism in BARBARA, All men (in the sense of being male in gender) are mortal; Xanthippe (Socrates' wife) is a man (in the generic sense of being a human being); therefore, Xanthippe is mortal. The argument as explicated does not state that Xanthippe is male, nor that all human beings as opposed specifically to males are mortal. We can therefore imagine that Xanthippe despite being a (non-male) human being is immortal, without contradicting the major premise that all men (males) are mortal.

6.6. *Intensionalist Fallacy*

Another commonly found deductive fallacy involves the attempt to draw inferences from assumptions containing an *intensional* or *nonextensional context*. An intensional or nonextensional context is one in which substi-

tuting codesignative terms or logically equivalent propositions sometimes changes the proposition's truth value from true to false or false to true. Some of the particular inferences from assumptions containing an intensional or nonexistensional context are deductively valid, but others are invalid. The argument form considered in general nevertheless commits the *intensionalist fallacy*. There are several main types of intensionalist fallacy. The most frequently encountered are known as *quotation* or *indirect discourse* and *propositional attitude intentionalist fallacies.*

As an example of a quotation or indirect discourse version of the intensionalist fallacy, consider the following proposition. The name 'Mark Twain' contains nine letters. This is a true proposition. However, the context [The name '_____' contains X letters] is intensional or nonextensional. When we substitute different codesignative terms that refer to the same thing in the blank, we are not guaranteed of preserving the proposition's truth value. We know that Mark Twain is the same person as Samuel Clemens, so we can affirm the truth of the identity statement, Mark Twain = Samuel Clemens. When we try to substitute the name 'Samuel Clemens' for 'Mark Twain' in the above proposition containing the intensional quotation context [The name '_____' contains X letters], we turn a true proposition, that the name 'Mark Twain' contains nine letters, into the false proposition, that the name 'Samuel Clemens' contains nine letters.

We say that intensional contexts do not support substitutions of terms equivalent in meaning in such a way as to save or preserve the truth, *salva veritate*; while purely extensional contexts by contrast always sustain the truth value of propositions in which they occur under any such substitutions. It is because intensional contexts do not support the intersubstitution of codesignative terms *salva veritate* that they constitute deductively invalid inferences. The quotation of a single term, phrase, or larger unit of discourse, is standardly said to *mention* rather than *use* that language item, predicating properties of the linguistic entity itself rather than whatever object or states of affairs to which it refers. Failing to observe the distinction between quote-mentioned and unquoted used terms and phrases is a common error of reasoning related to the intensionalist fallacy known as the *use-mention confusion.*

Another frequent form of the intensionalist fallacy involves propositional attitude or intentional contexts. Again, the fallacy requires a nonextensional context that does not permit intersubstitution of equivalent terms or propositions *salva veritate*. If Madelaine believes that Mark Twain wrote *Life on the Mississippi*, she does not necessarily believe that Samuel Clemens wrote *Life on the Mississippi*. She may have never heard of Samuel

Clemens, and may not know that 'Mark Twain' is the pseudonym or *nom de plum* of Samuel Clemens. The fact that Mark Twain is the same person as Samuel Clemens, and that Samuel Clemens wrote *Life on the Mississippi* does not deductively validly imply that Madelaine believes these things. The inference in which the fallacy occurs concerns only her beliefs, not the facts about which she may truly or falsely believe. We see the same kind of deductive fallacy arising in this form as before, but this time involving the psychological state or propositional attitude context, [X believes that _____]. Here we have:

1. Madelaine believes that Mark Twain wrote *Life on the Mississippi.*
2. Mark Twain = Samuel Clemens (Mark Twain wrote *Life on the Mississippi* if and only if Samuel Clemens wrote *Life on the Mississippi*).

3. Madelaine believes that Samuel Clemens wrote *Life on the Mississippi.*

The deductive invalidity of this type of intensionalist fallacy is clear enough from previous examples. It is logically possible for the assumptions to be true, but the conclusion false. The truth of the assumptions does not logically guarantee the truth of the conclusion. The same type of fallacy occurs for any choice of propositional attitude or psychological state context. We can generate unlimited instances of intensionalist fallacies for similar contexts involving the psychological predicates, 'believes', 'doubts', 'fears', 'hopes', 'desires', 'expects', 'knows', etc. The fact that propositional attitude or intentional psychological state descriptions are intensional or nonextensional is philosophically interesting.[6]

6.7. *Ad hominem*

We briefly now consider a suite of common classical fallacies, generally described in the informal logic or critical reasoning literature as informal or rhetorical fallacies. Upon reconstruction and analysis, all can be revealed as deductively invalid, and hence as positive instances of the deductivist thesis.

The *ad hominem* is an argument form directed literally against the person. There are *abusive* and *nonabusive* types of *ad hominem. Ad hominem* is nonabusively used whenever in argument we try to convince an opponent of the truth of a conclusion by drawing on propositions we believe the opponent to accept. In such cases, our arguments go against the person in the

---

[6] See Jacquette, 'Intentionality and Intensionality: Quotation Contexts and the Modal Wedge' (Jacquette 1986).

sense of attempting to turn some of an opponent's beliefs against some of the opponent's other beliefs. Such a strategy is not generally fallacious, but can offer a legitimate method of persuasion by argument, beginning with what an interlocutor regards as true as a dialectical starting place. This sort of argument is indeed quite common, since we can often only make headway in arguing against an opponent by appealing to something the person already accepts.

There is also an abusive form of *ad hominem* which is generally deductively invalid. The typical form of this fallacy is to raise logically irrelevant objections to someone's character, actions, or beliefs in order to discredit another proposition to which the person is committed. Thus, it is a fallacy to reason as follows:

1. Person X has claimed that P.
2. Person X has (morally or socially) undesirable property F.

3. P is false (improbable).

The argument is manifestly deductively invalid, and in that sense it is a logically fallacious form of inference. We see informally that the inference is deductively invalid because we can easily imagine circumstances under which the assumptions are true, but the conclusion false.

This type of *ad hominem* is abusive because it impugns someone's character as a reason for rejecting the person's beliefs. Typical applications of the abusive *ad hominem* occur when the charge is made that what an opponent has said should be disregarded as false, improbable, or unbelievable, because the person is a known thief, liar, member of a disreputable organization, or anything else that is likely to find disfavor with the arguer's intended audience. The abusive *ad hominem* in certain contexts can even include such factors as the opponent's race, gender, erotic orientation, or the like. Other versions of the fallacy make irrelevantly *honorific* rather than abusive attributions. These should also be considered under the broadest category of the *ad hominem*. It is just as fallacious to reason in this way:

1. Person X has claimed that P.
2. Person X has (morally or socially) desirable property F.

3. P is true (probable).

If person X states that $E = mc^2$, the truth or falsehood, probability or improbability, believability or unbelievability, has nothing in the least to

do with whether or not X is a genius or saint, a thief or sexual deviate. We cannot generally decide anything about the merits of proposition P from the praise or condemnation of the person's character. This type of rhetorically fallacious argument can nevertheless be effective in moving opinion through subtle but logically irrelevant psychological manipulation. The fact that a particular person of good or bad character has asserted a proposition or tendered an argument by itself has absolutely nothing whatsoever to do with whether the proposition is true or the argument correct, even when the judgments about the person are true. A genius or saint can make false pronouncements and propound unreasonable arguments just as well as anyone else. A thief or sexual deviate can similarly make true pronouncements and propound reasonable arguments just as well as anyone else, and can even truly assert or correctly deduce that it is wrong to steal or that certain types of sexual deviance in which they themselves indulge are morally impermissible.

6.8. *Tu quoque*

A subcategory of the abusive *ad hominem* is the *tu quoque*. This is another deductively invalid fallacy in which a critic is met by the logically irrelevant reply that the critic is guilty of the same offense or subject to the same objection. The Latin term *tu quoque* is an appropriate label for this kind of fallacy, because it means in effect, 'You too' or 'The same to you'. The *tu quoque* typically has this form:

1. My critic claims that I have wrongly done A.
2. However, my critic has also on at least some occasions done A.

3. My critic's claim that I have wrongly done A should be disregarded.

The *tu quoque* is more often presented as an enthymeme, in which the perpetrator merely asserts the equivalent of the first or second assumptions, and lets it go at that, leaving the conclusion implicit. Suppose a critic accuses me of being an embezzler. I reply that the critic has also been an embezzler. My counterclaim might be perfectly true, but it by no means absolves me of the crime. The *tu quoque* is a kind of abusive *ad hominem* because it does not speak to the proposition, but to the person. I say nothing to contradict the charge that I have embezzled, but in a logically irrelevant way I merely impugn my critic as having done the same. The *tu quoque* is often used as a psychological ploy, raising doubts about whether a critic who has made the same kind of mistakes is qualified to make an objection against others. As a rule with exceptions, *tu quoque* generally does not pro-

vide good reasons for overlooking a critic's objection; like other forms of abusive *ad hominem*, however, *tu quoque* can have the effect and may therefore serve the strategic purpose of leading an audience to reject or ignore a position or argument.

6.9. *Poisoning the Well*

A second subcategory of abusive *ad hominem* is *poisoning the well*. This type of *ad hominem* fallacy occurs when an attempt is made irrelevantly to discredit a source of information or authority. The well is poisoned, so to speak, when an audience is fallaciously led to believe that the target of the criticism is not a reliable source from whom to accept any judgment. The fallacy is *ad hominem* or against the person, because it seeks to devalue the credibility of someone's judgment on the basis of facts irrelevant to the person's expertise. The argument is not a fallacy by virtue of its logical form, because it is sometimes legitimate to cast doubt on the merit of the opinions given by a supposed authority. The fallacy of well-poisoning occurs in arguments with the following structure:

1. X maintains proposition P.
2. However, X has also maintained the false proposition Q.

---

3. The opinion of X should be disregarded in evaluating the truth (probability) of proposition P.

The fallacy tries to poison the well by discrediting someone's opinion generally on the grounds that the person is not universally knowledgeable or infallible. Often, the fallacy appears in the form of an objection to the effect, 'Why should we believe the expert (witness, etc.) now, when we know that he or she has been mistaken in the past?' This criticism has a certain force, because it raises a doubt about the person's reliability. Yet it is strictly deductively invalid, other things being equal, to conclude that persons are likely to be mistaken in any particular belief just because they have been mistaken about something else.

6.10. *Appeal to Authority (argumentum ad verecundiam)*

Less obviously rhetorically fallacious is the *appeal to authority* or *argumentum ad verecundiam*. As we have seen in connection with the *ad hominem* fallacy of poisoning the well, we must often rely on the judgment of experts. We do not always have the full knowledge necessary to evaluate the material truth of every proposition or soundness of every argument. There is a difference between genuine authorities and questionable or irre-

levant authorities, and the appeal to questionable or irrelevant authorities is a common fallacy of argument.

The *ad verecundiam* usually arises as an appeal to a questionable authority who is biased in some way with respect to the matter in which expert opinion is required, or who is an authority about some subject other than that involved in the question at issue. What makes such an argument fallacious is clear enough from the deductivist standpoint when we consider that we cannot reasonably infer, in the sense of deductive validity, the likely truth of opinions given by a questionable or irrelevant authority. The fallacy has this form:

1. Authority A maintains proposition P.

2. Proposition P is true (probable).

The argument is evidently deductively invalid when the authority in question is prejudiced in certain ways, so that the opinion offered as authoritative derives from a bias or special motive. An obvious case is when somehow who is legitimately an authority on a subject has been bribed or has some other definite stake in the acceptance of the inference, so that the pronouncement made, although given by a recognized authority, carries no reliable guarantee of its truth, probability, or believability. A similar case is when the source is an authority, but only in another irrelevant subject matter. An authority on computer technology need not be qualified to offer expert opinion on a matter of contract law; a specialist in ornithology need not be in a sound position to pronounce on the truth or falsehood of a hypothesis about genetic fingerprinting. This is not to say that the judgment of an authority from an irrelevant field must be false, but only that if such a judgment is true, its truth cannot reasonably be inferred from the fact that the expert is an authority about some other subject.

6.11. *Appeal to Majority (argumentum ad populum)*

A related fallacy is the *appeal to majority* or *argumentum ad populum*. From the fact that a majority of persons accepts a proposition it by no means logically follows that the proposition is true, or even probable or believable. The form of the *ad populum* fallacy is similar to that of the *ad verecundiam*:

1. A majority of persons maintains proposition P.

2. Proposition P is true (probable).

There is a natural presumption that if many persons accept a proposition, then the proposition is likely to be true. Yet from a logical standpoint such an inference is clearly invalid. On any particular issue, everyone, and certainly a 50%+ majority of persons, might be wrong. The *ad populum* typically arises in conjunction with a subtle appeal to emotion. We have a psychological tendency not to want to be excluded from any generally accepted opinion. If many people believe some proposition, we may suppose it is more likely than not that the proposition is true, and we may wish to be included among those who have come to accept the proposition, rather than be left out of what others claim to know. The fallacy capitalizes on this assumption of likelihood and desire to conform in belief.

6.12. *Appeal to Ignorance (argumentum ad ignorantiam)*

It is a fallacy to infer from the fact that we do not know a particular proposition to be false that therefore it is true. This is the fallacy of appealing to ignorance or *argumentum ad ignorantiam*. The argument has this form:

1. It is not known that (or whether) proposition P is false.

2. Proposition P is true (probable).

The fallacy is often found where the lack of evidence for a proposition is taken as implying that the proposition is false. Many examples are not so obviously fallacious as in the above simplified schematization. I might fallaciously conclude from the fact that I see no lights burning in a house at a certain hour of night that no one is home. This conclusion may but need not be true, and in any case is not deductively validly supported by the truth of the assumption. Or I might hear someone say that we have no reason to believe that God exists, and conclude that therefore God does not exist. Again, the conclusion may or may not be true, but cannot in any case be validly derived from the negative proposition expressing the lack of or ignorance of relevant information in the assumption.

6.13. *Appeal to Emotion (argumentum ad misericordiam)*

The *appeal to emotion* or *argumentum ad misericordiam* is a fallacy that plays on logically irrelevant emotional response. Stylistically, appeals to emotion can be very different in appearance, sometimes invoking feeling by facial expression, tone of voice, depiction of moving circumstances, or even more theatrical dramatic effects, that are logically irrelevant to the merits of the inference to a conclusion.

There is a wide range of emotions to which a use of the *ad misericordiam* fallacy can appeal. As the Latin name suggests, a common form is the appeal to pity. A fallacy of this type might seek to convince a jury that someone accused of a crime should go free after describing the pitiful but factually irrelevant conditions under which the person was raised, or another entirely unrelated trauma they have recently experienced in life. If the jury can be made to feel sufficient sympathy for the person, its members might accept the defense attorney's conclusion. This may indeed be a humane decision, and the attorney's efforts in this regard might be effective courtroom practice, yet any such argument is logically fallacious. There are also other emotions that are irrelevantly called upon to win support for a conclusion, in fallacies that evoke feelings of anger, fear, joy, resentment, and the like. Back in the courtroom, we can imagine the prosecuting attorney in the same case evoking feelings of anger and resentment against the accused, possibly by baiting the person into a show of hostility. The possibilities are endless – as rich and potentially misleading as the conflicts of emotion and reason in everyday experience may cause us to expect. The fallacy has the following schematic form:

1. Emotional response R is somehow made to occur.
2. Emotional response R is psychologically associated with acceptance of proposition P.

3. Proposition P is true (probable).

The error here is easy enough to spot when the argument is made explicit. The *ad misericordiam* relies on the strength of emotion as a driving force in our lives, to which even the most disciplined reason sometimes yields. The panoply of theatrical devices by which emotions can be provoked easily leads thought astray. A classic example is the spread of mob violence among normally sedate law-abiding citizens when their fear or anger has been incited. Other instances include the use of propaganda by political demagogues to manipulate opinion in logically irrelevant ways by arousing pity, anger, fear, and the like emotions.

6.14. *Appeal to Force (argumentum ad baculum)*

A final example in which an informal or rhetorical fallacy is reduced to deductively invalid inference is the fallacy of trying to convince someone of the truth of an argument's conclusion by appeal to force or *argumentum ad baculum*. This fallacy is similar to if not just a special case of the *argumentum ad misericordiam*. If we are persuaded that a conclusion should

be accepted because of the threat of force, then this undoubtedly occurs in part at least because of the emotional force of fear. The Latin phrase used for this fallacy means literally an argument 'with a club'. The *ad baculum* is a blunt weapon that threatens to beat us into submissive agreement. The threat need not be physical, but could be financial, psychological, or any perceived danger or evil.

An *ad baculum* is often raised by persons who want to stress the urgency of adopting a certain proposal in order to avoid a real or imagined disaster. Whether or not the argument is valid or fallacious can depend on whether or not the threat is real or imagined, and on whether or not the proposal if adopted could in fact or be reasonably expected to avert the threat. There is a difference between the fallacy of conjuring up a threat merely for the psychological effect of producing acceptance of a certain conclusion, and describing a potential danger and outlining a sensible response by which the danger might be avoided. An example of the fallacy of appeal to force is to say that if a certain tax is not approved, then essential military spending will go unfunded, and our enemies will find us so vulnerable that they will be tempted to attack. The argument is fallacious if there is no relevant connection between approval of the tax, the military spending projected, and aversion of the danger of foreign military threat, or if the threat of foreign military invasion is imaginary or contrived. Another common example is the explicit threat of certain religious teachings, that unless we accept a given set of beliefs and conduct our lives in certain ways we can expect disadvantages in this life, or the eternal punishment of our immortal souls after death. Again, whether an argument of this sort is a fallacy depends on the facts of the case.

The *ad baculum* has this logical form:

1. If proposition P is not accepted as true, then danger D threatens a definite harm.

2. Proposition P is true (probable).

The deductive invalidity involved in the *ad baculum* by now should be clear on inspection as fitting the same pattern as the reconstructions of previous informal or rhetorical fallacies. All in different distinctive ways are deductively invalid in that they represent inferences in which it is logically possible for the assumptions to be true and the conclusions false. Deductivism maintains that the same is true of any inference token or type that is correctly described as a logical fallacy.

7. Fallacies as Logically Defective Deductively Invalid Arguments

A fallacy can appear in anyone's thought, most embarrassingly in one's own. We can improve our thinking by healthy criticism, with the aim of minimizing logically incorrect reasoning by learning to recognize and avoid the most common fallacies. Fallacies, according to deductivism, are logically defective arguments that can be categorized as failing to satisfy the most basic logical requirement by being deductively invalid. The list of fallacies is open-ended, and, in that sense, there may be innumerable fallacies, the most notable of which are cataloged in the taxonomy we have considered. Although the present venue does not permit more searching and exhaustive examination even of some of the most commonly identified fallacies, we have hopefully presented a wide enough selection to indicate the kinds of reconstructions of fallacies the deductivist can present in defense of the thesis that all informal or rhetorical fallacies are at bottom instances of deductively invalid reasoning.[7]

References

Eemeren, F. H. van & Grootendorst, R. (1992), *Argumentation, Communication, and Fallacies: A Pragma-Dialectical Perspective*, Lawrence Erlbaum Associates, Hillsdale.

Engel, M. (1994), *With Good Reason: An Introduction to Informal Fallacies*, 5th edition, St. Martin's Press, New York.

Gula, R. J. (2002), *Nonsense: A Handbook of Logical Fallacies*, Axios Press, Mount Jackson.

Hamblin, C. L. (1970), *Fallacies*, Studies in Critical Thinking, Vale Press, Newport News.

Hansen, H. V. & Pinto, R. C., eds. (1995), *Fallacies: Classical and Contemporary Readings*, The Pennsylvania State University Press, University Park.

Jacquette, D. (1986), 'Intentionality and Intensionality: Quotation Contexts and the Modal Wedge', *The Monist* 59, 598–608.

Jacquette, D. (2007a), 'Deductivism and the Informal Fallacies', *in* F. H. van Eemeren, J. A. Blair, C. A. Willard, & Bart Garssen, eds., *Proceedings of the Sixth Conference of the International Society for the Study of Argumentation* (ISSA), Sic Sat (International Center for the Study of Argumentation), Amsterdam, vol. 1, pp. 687–692.

Jacquette, D. (2007b), 'Deductivism and the Informal Fallacies', *Argumentation* 21, 335–347.

Jacquette, D. (2007c), 'On the Relation of Informal to Symbolic Logic', *in* D. Jacquette, ed., *Handbook of the Philosophy of Logic*, Handbook of the Philosophy of Science series, North-Holland (Elsevier Science), Amsterdam, pp. 131–154.

Jacquette, D. (2007d), 'Reasoning Awry: An Introduction to Woods and Walton', *in* J. Woods & D. N. Walton, *Fallacies: Selected Papers 1972–1982*, King's College Publications, London, pp. vii–xvi.

Kant, I. (1965), *Critique of Pure Reason*, translated by Norman Kemp Smith, St. Martin's Press, New York.

Larsen, A. & Hodge, J. (2006), *The Art of Argument: An Introduction to the Informal Fallacies*, Classical Academic Press, Camp Hill.

Sellars, W. (1970), 'Are There Non-Deductive Logics?', *in* N. Rescher, ed. (on behalf of the editorial committee), *Essays in Honor of Carl G. Hempel: A Tribute on the Occasion of his Sixty-Fifth Birthday*, Synthese Library, D. Reidel Publishing Co., Boston – Dordrecht, pp. 83–103.

Tindale, C. W. (2007), *Fallacies and Argument Appraisal*, Cambridge University Press, Cambridge.

Woods, J. & Walton, D. N. (2007), *Fallacies: Selected Papers 1972–1982 with a Foreword by Dale Jacquette*, King's College Publications, London.

Dale Jacquette
Senior Professioral Chair in Theoretical Philosophy
Institute of Philosophy
University of Bern
Länggassstrasse 49a
CH–3000 Bern 9, Switzerland
dale.jacquette@philo.unibe.ch