

## The Deductive/Inductive Distinction\*

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**Abstract:** In this paper I examine five distinctions between deductive and inductive arguments, concluding that the best of the five defines a deductive argument as one in which conclusive favorable relevance to its conclusion is attributed to its premises, and an inductive argument as any argument that is not deductive. This distinction, unlike its rivals, is both exclusive and exhaustive; permits both good and bad arguments of each kind; and is both useful and needed in evaluating at least some arguments.

In past years a debate flourished concerning the content and value of the distinction between deductive and inductive arguments. Five ways of distinguishing deductive from inductive arguments figured in that debate. In this paper I shall examine critically each of them, concluding that one is, with minor revision, defensible against the many criticisms leveled at it.

My procedure with regard to each of the five distinctions will be first to state the distinction, along with any available clarification and defense, and then to present objections to the distinction, along with any appropriate replies. For the sake of fairness and thoroughness, I shall include an objection or reply either if it has appeared in the literature or if it seems reasonable.

In my discussion I shall assume the following: where ' $p$ ' and ' $q$ ' stand for propositions, ' $p$ ' is either relevant or irrelevant to ' $q$ '. For example, 'Most papers are too long' is relevant to 'This paper is too long', whereas

'At least one cat has kittens' is not. If ' $p$ ' is relevant to ' $q$ ', then it is so either favorably or unfavorably. For example, 'Most papers are too long' is favorably, whereas 'Few papers are too long' is unfavorably, relevant to 'This paper is too long'. If ' $p$ ' is favorably or unfavorably relevant to ' $q$ ', then it is so either conclusively or inconclusively. For instance, 'All papers are too long' is conclusively favorably relevant to 'This paper is too long', because the first of these propositions entails the second; whereas 'Most papers are too long' is inconclusively favorably relevant to 'This paper is too long', since the first of these propositions makes the second probable. And finally, irrelevance as well as any degree of favorable or unfavorable relevance may be actual, attributed, or both. For example, in

The fact that most papers are too long makes it certain that this paper is too long.

conclusive favorable relevance to the conclusion, 'This paper is too long', is attributed, but does not actually belong, to the premise, 'Most papers are too long'. But in

The fact that most papers are too long makes it probable that this paper is too long.

inconclusive favorable relevance to the same conclusion not only is attributed, but actually belongs, to the same premise.

I shall also assume that the terms 'deductive' and 'inductive' are alike in that if one were evaluative, so would be the other. Now, the expressions 'deductive and good', 'deductive and bad', 'inductive and good',

and 'inductive and bad' are neither pleonasm nor oxymorons, as they would be if 'deductive' or 'inductive' were evaluative. Therefore, neither term is evaluative. This means that deductive and inductive arguments can both be either good or bad.

## I. Distinction 1

The first distinction I shall discuss is the almost universally discarded traditional one saying that deductive arguments are those whose premises are general and whose conclusion is particular, whereas inductive arguments are those whose premises are particular and whose conclusion is general.<sup>1</sup>

To this distinction I shall consider two objections.

*Objection 1.* This distinction is unacceptable because there are arguments that are deductive or inductive without conforming to its definitions of 'deductive argument' or 'inductive argument'. For instance, the argument

Premise 1. All animals are mortals.

Premise 2. All humans are animals.

Conclusion. All humans are mortals.

is deductive although, contrary to this distinction, its conclusion is general rather than particular.<sup>2</sup> And the argument

Premise 1. Amy is taller than Beatrice.

Premise 2. Beatrice is taller than Carlene.

Conclusion. Amy is taller than Carlene. is also deductive although, again contrary to this distinction, its premises are particular.<sup>3</sup>

*Reply.* In logic, 'deductive argument' and 'inductive argument' are technical terms, used differently by different authors holding different theories about what distinguishes deductive from inductive arguments. Therefore, since there are no pretheoretical intuitions about the correct use of technical terms, there are no pretheoretical intuitions regarding the proper use of 'deductive argument' and 'inductive argument'. So, whatever intuitions govern the use of the terms 'deductive argument' and 'inductive argument' are in-

formed by one or more theories. To appeal, then, to such intuitions in arguing against some distinction between deductive and inductive arguments would be to beg the question against that distinction by assuming the truth of one or more rival theories (namely, those shaping the intuitions appealed to). For example, the present objection begs the question against Distinction 1 by assuming a rival distinction (probably Distinction 2 or 3). So, in reply to this objection, an advocate of Distinction 1 might simply decline to assent that the alleged counterexamples are deductive, and that would be that. To avoid such fruitless collisions of theories, I shall henceforth avoid appealing to intuitive judgments that given arguments are deductive or inductive.

*Objection 2.* The deductive/inductive distinction is so related to the evaluation of arguments that at least three criteria<sup>4</sup> of the adequacy of any particular way of distinguishing deductive from inductive argument are concerned, directly or indirectly, with argument evaluation.<sup>5</sup> The first criterion is that the distinction should, if possible, be both exclusive and exhaustive (*i.e.*, it should be so drawn that [a] no argument can be both deductive and inductive, and [b] every argument is either deductive or inductive).<sup>6</sup> On the plausible assumption that the deductive/inductive distinction is so tied to the evaluation of arguments that a deductive argument is evaluated by reference to a different standard than an inductive argument, we can explain why the distinction should, if possible, be both exclusive and exhaustive. It should be exclusive in order to prevent the same argument's being evaluated by reference to more than one standard at once. And it should be exhaustive in the interests of economy: it is undesirable needlessly to multiply the standards by reference to which arguments are evaluated.<sup>7</sup>

The second criterion is that any adequate distinction between deductive and inductive arguments must at least permit both good and bad arguments of each kind.<sup>8</sup> For

if the deductive/inductive distinction did not at least permit both good and bad arguments of each kind, we would be committed to one or more of the following unacceptable consequences:

- (a) No deductive argument can be good.
- (b) No deductive argument can be bad.
- (c) No inductive argument can be good.
- (d) No inductive argument can be bad.

The third criterion is that the distinction should, if possible, facilitate, or even be necessary to, the evaluation of arguments.<sup>9</sup>

Distinction 1 fails to satisfy the first criterion, since it is not exhaustive (see the arguments used as counterexamples in the preceding objection).<sup>10</sup> It also fails to satisfy the third criterion, since the fact that an argument's premises are general and its conclusion particular, or that its premises are particular and its conclusion general, is neither necessary nor helpful in ascertaining whether it is good or bad. For these two reasons, Distinction 1 should be discarded.

## II. Distinction 2

The second distinction that I shall consider divides the class of arguments into deductive and inductive arguments according to their families. Categorical syllogisms (the good ones as well as the bad) constitute one family of arguments, analogical arguments (again, the good as well as the bad) constitute another, and so on. An argument is deductive if it belongs to one group of families and inductive if it belongs to the other. Categorical syllogisms, hypothetical syllogisms, disjunctive syllogisms, quantificational arguments, mathematical arguments, *etc.* belong to one group; if an argument belongs to a family in this first group, it is deductive. Generalizations from particular instances, analogical arguments, causal arguments, good-reasons arguments, *etc.* belong to the other group; if an argument belongs to a family in this second group, it is inductive.<sup>11</sup>

If it be asked why the families should be grouped as they are (with, for example,

categorical syllogisms grouped with mathematical arguments rather than with causal arguments), and why belonging to a family in the first group would make an argument deductive whereas belonging to a family in the second would make an argument inductive, the answer is as follows. If a family of arguments is such that formal features reveal whether its members' premises are conclusively favorably relevant to their conclusions, then that family belongs to the first group, and its members are deductive; if it is such that formal features reveal whether its members' premises are inconclusively favorably relevant to their conclusions, then it belongs to the second group, and its members are inductive.<sup>12</sup>

This distinction is subject to the following two objections.

*Objection 1.* The distinction will not be exhaustive unless every argument belongs to at least one family and every family belongs to at least one of the two groups. Now, it is not obvious that every argument belongs to at least one such family, and no proof or evidence is given. Moreover, given the rationale for assigning a family of arguments to one rather than the other of the two groups, it seems that not every family can be assigned to one group or the other, so that the distinction cannot be exhaustive. For that rationale depends on there being formal features of a family's arguments that reveal whether its members' premises are conclusively or inconclusively favorably relevant to their conclusions. But formal features alone do not always determine whether the premises of arguments of a given family are inconclusively favorably relevant to their conclusions.<sup>13</sup> For instance, whether the premises of analogical arguments are inconclusively favorably relevant to their conclusions depends, in part, on the number of relevant disanalogies among the things mentioned only in the premises and those mentioned only in the conclusion and also on whether the analogy reasoned from is relevant to the analogy reasoned to;<sup>14</sup> but these features

seem not to be formal. Therefore, the rationale given for assigning a family of arguments to one group rather than the other seems to be inconsistent with the distinction's being exhaustive.

*Objection 2.* The distinction is not exclusive, because the rationale for assigning a family of arguments to one rather than the other of the two groups will sometimes require that the same family be assigned to both groups. Consider, for example, the family of arguments having the form of hypothetical syllogism. Formal features show that their premises are conclusively favorably relevant to their conclusions. According to the rationale, a family of arguments belongs to the first (the deductive) group if formal features of those arguments show whether their premises are conclusively favorably relevant to their conclusions. So, this family belongs to the first group, making arguments in the hypothetical syllogism family deductive. Now, the premises of no argument can be at once both conclusively and inconclusively favorably relevant to its conclusion. By the same reasoning, then, the same formal features of arguments in the hypothetical syllogism family that show that their premises are conclusively favorably relevant to their conclusions also show (a) that their premises are *not* inconclusively favorably relevant to their conclusion, and *a fortiori* (b) *whether* their premises are inconclusively favorably relevant to their conclusions. So, since the rationale says that a family of arguments belongs to the inductive group if formal features of those arguments reveal *whether* their premises are inconclusively favorably relevant to their conclusions, this family belongs to the second group too, making arguments having the form of hypothetical syllogism inductive as well as deductive. Similarly, if there are formal features of other arguments that show that their premises are inconclusively favorably relevant to their conclusions, the same features show whether their premises are conclusively favorably relevant to their

conclusions; and so, again, the families to which the arguments belong would be in both groups at once, and hence those arguments would be both deductive and inductive.

Suppose we attempt to avoid this objection by revising the rationale to say that a family of arguments belongs to one of the two groups if formal features of those arguments show (not *whether* but) *that* their premises are conclusively or inconclusively favorably relevant to their conclusions. In that case, the distinction between deductive and inductive arguments would not be exhaustive. There are two reasons for this. (1) As observed above concerning analogical arguments, formal features alone sometimes do not determine *whether* the premises of arguments of a given family are inconclusively favorably relevant to their conclusions; in such cases, then, formal features do not determine *that* the premises are inconclusively favorably relevant to their conclusions. So, according to the revised rationale, arguments belonging to such families would not be inductive. Nor would they be deductive if (as in the case of at least some analogical arguments) formal features alone did not determine *that* their premises are conclusively favorably relevant to their conclusions. Consequently, such arguments would be neither inductive nor deductive. (2) Formal features of some arguments show that their premises are neither conclusively nor inconclusively favorably relevant to their conclusions, and so they would be neither deductive nor inductive. For instance, the argument *ex pressed* in the text

Descriptive metaphysics has had a long and complicated history, and consequently there are no new truths to be discovered in it.<sup>15</sup>

has the form

Premise. *x* has had a long and complicated history.

Conclusion. There are no new truths to be discovered in *x*.

which determines that the argument's premise is neither conclusively nor inconclusively favorably relevant to its conclu-

sion, so that the argument would be neither deductive nor inductive.<sup>16</sup>

Moreover, the revised rationale would not permit the existence of both good and bad deductive arguments. For according to it, a family of arguments would belong to the deductive group only if formal features of those arguments showed that their premises are conclusively favorably relevant to their conclusions. Every argument that belonged to a family in the deductive group, then, would be such that formal features of that argument show that its premises are conclusively favorably relevant to its conclusion. That means that every deductive argument would be good.<sup>17</sup>

### III. Distinction 3

Having rejected the first two distinctions between deductive and inductive arguments, we proceed to the third, which distinguishes the two kinds of arguments according to the degree of favorable relevance that the premises actually have to the conclusion. It says that an argument is deductive if and only if its premises actually are conclusively favorably relevant to its conclusion, and it is inductive if and only if its premises actually are inconclusively favorably relevant to its conclusion.<sup>18</sup>

To this distinction there are three objections.

*Objection 1.* The distinction is not exhaustive. For there are some arguments whose premises are neither conclusively nor inconclusively favorably relevant to their conclusions (*viz.* arguments whose premises are either irrelevant or unfavorably relevant to their conclusions), so that, according to this distinction, they would be neither deductive nor inductive. For instance, the premise of the argument

Premise. Descriptive metaphysics has had a long and complicated history.

Conclusion. There are no new truths to be discovered in descriptive metaphysics.

is neither conclusively nor inconclusively favorably relevant to its conclusion. Hence, according to this distinction, this argument would be neither deductive nor inductive.<sup>19</sup>

*Objection 2.* The distinction does not permit both good and bad arguments of both kinds. For if a deductive argument is one in which the premises are conclusively favorably relevant to the conclusion, then there can be no distinction between good and bad (valid and invalid) deductive arguments. And if an inductive argument is one in which the premises are inconclusively favorably relevant to the conclusion, then although there can be better and worse inductive arguments (distinguished by the degree of inconclusive favorable relevance of the premises to the conclusion), there can be no distinction between good and bad inductive arguments.<sup>20</sup>

*Objection 3.* In the case of arguments with unexpressed premises, ascertaining whether the argument is deductive or inductive will at least sometimes be a circular procedure. Suppose someone says, "The fact that Fido is a dog proves that he has fleas", so that his argument's conclusion is 'Fido has fleas' and its one explicit premise is 'Fido is a dog'. Is this argument deductive or inductive? Under the present distinction, we cannot say until we have completed the argument by supplying its unexpressed premise; for until all of its premises have been made explicit, we cannot ascertain whether its premises jointly are conclusively or inconclusively favorably relevant to its conclusion. So, what is that unexpressed premise? It might be 'All dogs have fleas' or 'Almost all dogs have fleas' or 'Most dogs have fleas', and so on. How do we decide which to supply? Although several considerations (*e.g.*, background beliefs, the Principle of Charity) might bear on this question, this much surely is relevant: we should supply 'All dogs have fleas' if the argument is deductive, but one of the other candidates if it is inductive. This brings us back to our initial question: is the argument deductive, or is it inductive?<sup>21</sup>

#### IV. Distinction 4

Having rejected the first three distinctions, we proceed to one that has been often criticized but that, with some revision, is better than its competitors. It deals with attributed, rather than actual, favorable relevance and says that an argument is deductive if and only if conclusive favorable relevance to the conclusion is attributed to the premises, and an argument is inductive if and only if inconclusive favorable relevance to the conclusion is attributed to the premises.<sup>22</sup>

It is deliberate that the agent of attribution (*i.e.*, who or what attributes to the premises one degree or another of favorable relevance to the conclusion) is here unspecified. Usually, the most conspicuous such agent would be the arguer (*i.e.*, the person or other rational being who offers the argument). But it need not always be so. Someone may have an argument in mind without accepting or offering it himself, in which case he would not himself attribute to the premises any degree of favorable relevance to the conclusion. Moreover, an argument might be expressed independently of any rational agency — *e.g.*, an improbable natural arrangement of colored pebbles on a beach might read

The facts that all dogs have fleas and that Fido is a dog make it certain that Fido has fleas.

thereby expressing the argument

Premise 1. All dogs have fleas.

Premise 2. Fido is a dog.

Conclusion. Fido has fleas.

so that there would be no arguer to attribute any degree of favorable relevance to the premises. In such admittedly atypical but nevertheless possible cases as these, although no arguer attributes to the premises any degree of favorable relevance to the conclusion, something else does. In the first case — the case of someone having an argument in mind without endorsing it — the attribution is done not by the argument's uncommitted contemplator but by a propo-

sition he has in mind (but does not accept) that sums up the whole argument (*viz.*, a proposition that says that the premises are, to some degree, favorably relevant to the conclusion). For instance, if someone is considering, but not yet accepting or offering, an argument whose premises are 'All dogs have fleas' and 'Fido is a dog' and whose conclusion is 'Fido has fleas', he does not attribute to the premises any degree of favorable relevance to the conclusion, since he does not accept the argument; but in order to contemplate the argument, he must at least have in mind a proposition that so relates some of its constituents (its premises) to another (its conclusion) that it attributes to the former some degree of favorable relevance to the latter; otherwise, what he contemplates would not be an argument.<sup>23</sup> Similarly, in the second case — the case of an argument's being expressed independently of any rational agency — the attribution is done not by any rational being but again by the proposition that sums up the whole argument and is expressed by the entire text. For instance, the previously mentioned improbably but naturally arranged colored pebbles on a beach express not only the propositions that are the argument's premises and conclusion but also a further proposition saying that 'All dogs have fleas' and 'Fido is a dog' are jointly conclusively favorably relevant to 'Fido has fleas'. Even in cases where an arguer is involved, he attributes to the premises some degree of favorable relevance to the conclusion only insofar as he believes or expresses a proposition that does so. In all arguments, then, one agent of attribution is such a proposition; in some, another agent is the arguer.

In favor of Distinction 4 it has been urged that it permits good and bad arguments of both kinds.<sup>24</sup> For among deductive arguments (that is, those whose premises are said to be conclusively favorably relevant to their conclusions), the good ones are those whose premises really are conclusively favorably relevant to their

conclusions, whereas the bad are the remainder. Similarly, among inductive arguments (that is, those whose premises are said to be inconclusively favorably relevant to their conclusions), the good ones are those whose premises really are inconclusively favorably relevant to their conclusions, whereas the bad are the remainder.<sup>25</sup>

To this distinction have been raised fourteen objections of unequal merit. I wish to show that Distinction 4 (when suitably amended) is defensible against all of these objections, so that there is no impediment to its acceptance. Consequently, I shall address all of them.

*Objection 1.* Arguers often claim that their premises are favorably relevant to their conclusion without explicitly attributing to the premises one degree rather than another of favorable relevance to the conclusion. In such cases, under Distinction 4, their arguments would be neither deductive nor inductive.<sup>26</sup>

*Reply.* The objection presupposes that an arguer who attributes to his premise some degree, or range of degrees, of favorable relevance to his conclusion must do so explicitly (e.g., by means of expressions like 'proves', 'suggests', 'certainly', and 'probably'). But this presupposition is false: an arguer may not make explicit all that he thinks concerning the relation between his premise and his conclusion: he may attribute to his premise some degree, or range of degrees, of favorable relevance to his conclusion without communicating that attribution.<sup>27</sup> Therefore, contrary to the objection, even if an arguer does not explicitly claim that his premises are to some degree, or range of degrees, favorably relevant to his conclusion, it does not follow that, on Distinction 4, his argument is neither deductive nor inductive.

Nor does it follow that we can have no knowledge or justified belief about the content of such a tacit attribution.<sup>28</sup> For we may have pertinent knowledge about the arguer's reasoning habits, about the reasoning habits of a class of reasoners to which he belongs, or about the reasoning habits of

people generally.<sup>29</sup> Consequently, even though an arguer says nothing about the degree, or range of degrees, of favorable relevance of his premise to his conclusion, Distinction 4 can still help to provide good reasons for thinking his argument deductive or inductive.<sup>30</sup>

The next two objections have a common reply.

*Objection 2.* Distinction 4 is not exhaustive, because there may be occasions when an arguer attributes to his premises only favorable relevance, rather than any particular degree of favorable relevance, to his conclusion.<sup>31</sup> This is possible because, although it is true that if his premises are favorably relevant to his conclusion, they must be so either conclusively or inconclusively, it is not true that if the arguer attributes favorable relevance to his premise, he must attribute either conclusive or inconclusive favorable relevance to them.

*Objection 3.* The distinction is not exhaustive, because, as already noted, an argument might be expressed independently of any rational agency. In such an instance, there might be neither explicit nor implicit attribution to the premises of conclusive or inconclusive favorable relevance to the conclusion. For example, suppose that an improbable natural arrangement of colored pebbles produces on a beach the following text:

The facts that all dogs have fleas and that Fido is a dog make it at least probable that Fido has fleas.

This would express an argument and attribute to the premises favorable relevance to the conclusion; but it would not, in any manner, attribute either conclusive or inconclusive favorable relevance. Hence, according to this distinction, the argument would be neither deductive nor inductive.

*Reply.* To avoid the difficulties raised by Objections 2 and 3, Distinction 4's definition of 'inductive argument' might be revised to this: "an argument is inductive if and only if it is not deductive".<sup>32</sup> An argu-

ment, accordingly, is deductive if conclusive favorable relevance to the conclusion is attributed to the premises; otherwise, it is inductive. The argument mentioned in Objection 3, then, would be inductive, since in that instance conclusive favorable relevance to the conclusion is not attributed to the premises.<sup>33</sup> Distinction 4 would thus be exhaustive.<sup>34</sup>

In accordance with this revision of Distinction 4, the difference between good and bad arguments of both kinds might be revised thus: an argument is good if and only if the attributed and actual degrees of relevance of its premises to its conclusion agree. So, for instance, since in a deductive argument conclusive favorable relevance to the conclusion is attributed to the premises, such an argument will be good if and only if its premises actually are conclusively favorably relevant to its conclusion. Similarly, an inductive argument in which some degree of inconclusive favorable relevance to the conclusion is attributed to the premises will be good if and only if its premises actually are to that same degree inconclusively favorably relevant to its conclusion. Likewise, an inductive argument in which favorable relevance alone (without regard to whether it is conclusive or inconclusive) to the conclusion is attributed to the premises will be good if and only if the premises actually are favorably relevant to the conclusion.<sup>35</sup>

It might be objected that, aside from its ability to answer Objections 2 and 3, this amendment of Distinction 4 is arbitrary. For consider the following three classes of arguments. Class 1 contains arguments in which conclusive favorable relevance to the conclusion is attributed to the premises. According to Distinction 4, arguments in Class 1 are deductive. Class 2 contains arguments in which inconclusive favorable relevance to the conclusion is attributed to the premises. According to Distinction 4, arguments in Class 2 are inductive. Class 3 contains arguments in which neither conclusive nor inconclusive but only an un-

qualified favorable relevance to the conclusion is attributed to the premises. According to the amendment of Distinction 4 proposed by the present reply, arguments in Class 3 are inductive because they are not deductive. But why should we not say instead that they are deductive because they are not inductive? Why should we group arguments in Class 3 together with arguments in Class 2 rather than with arguments in Class 1?

The reasons why it is not arbitrary for the amendment to Distinction 4 to classify the arguments in both Class 2 and Class 3 as inductive are these. An assumption common to all or most of those who distinguish deductive from inductive arguments is that the conditions necessary for an argument to be deductive, or for a deductive argument to be good, are (in some sense) more stringent and less easily satisfied than those for an argument to be inductive, or for an inductive argument to be good. Now, in order for the deductive arguments in Class 1 to be good, their premises must be conclusively favorably relevant to their conclusions; in order for the inductive arguments in Class 2 to be good, their premises must be inconclusively favorably relevant to their conclusions; and in order for the arguments in Class 3 to be good, their premises must be (conclusively or inconclusively — it doesn't matter) favorably relevant to their conclusions. So, since there are many, more easily attained degrees of favorable relevance short of the highest, the conditions necessary for an argument in Class 2 to be good are more easily satisfied than are those necessary for an argument in Class 1 to be good; and those necessary for an argument in Class 3 to be good are still more easily satisfied. The amendment to Distinction 4, then, accords with this common assumption in classifying the arguments in Class 3 with those in Class 2 rather than with those in Class 1. It is therefore not arbitrary.

*Objection 4.* Distinction 4 is not exclusive. For different arguers can give the

same argument,<sup>36</sup> one attributing conclusive, and the other inconclusive, favorable relevance to the premises; so that the same argument can be both deductive and inductive.<sup>37</sup>

*Reply.* This objection presupposes that arguments are individuated only by their premises and conclusions (*i.e.*, that arguments are different if and only if they have different premises, different conclusions, or both). For instance, these two texts

The fact that most papers are too long makes it certain that this paper is too long.

The fact that most papers are too long makes it probable that this paper is too long.

would express a single argument, since the premises are the same and the conclusions are the same. But if this way of individuating arguments were correct, then, since the same argument would be expressed in both of the above texts, if the argument expressed in the first text were bad with respect to the relation between its premise and its conclusion, so would be the argument expressed in the second; and if the argument expressed in the second text were good in the same respect, so would be the argument expressed in the first. Neither of these consequents seems true: the first text seems to express an argument that is bad with respect to the relation between its premise and its conclusion, whereas the second seems to express an argument that is good in the same respect. Because the same argument cannot be both good and bad in the same respect, then, arguments must be individuated by more than just their premises and conclusions.<sup>38</sup>

*Objection 5.* Distinction 4 depends on our ascertaining what degree of favorable relevance to a conclusion is attributed to premises. But that is alien to logic, which is concerned only with the degree of favorable relevance that actually obtains between premises and conclusion. Hence, logic cannot properly accommodate any reference to attributed favorable relevance.

And so, in logic neither 'deductive argument' nor 'inductive argument' can be properly defined even partly in terms of attributed favorable relevance.<sup>39</sup>

*Reply.* Although the claim that logic is not concerned with attributed favorable relevance might be true of formal logic, it is not true of logic in general. For one of the things that such logic does is to describe how, through illatives like 'therefore' and 'because', we indicate our own, or detect others', arguments; and illatives are expressions of attributed favorable relevance.

If logic can be properly concerned with attributed favorable relevance in order to indicate or detect arguments, it can also properly be concerned with attributed favorable relevance in order to ascertain whether arguments are deductive or inductive.

*Objection 6.* The concept of conclusive favorable relevance presupposes two distinctions: (a) between logical and empirical connections and (b) between premises' being true and their being properly related to a conclusion. If, then, Distinction 4 is right in saying that deductive arguments are those in which conclusive favorable relevance to the conclusion is attributed to the premises, whereas inductive arguments are those in which inconclusive, as distinguished from conclusive, favorable relevance to the conclusion is attributed to the premises, an argument will not be deductive or inductive unless the arguer grasps both of the above distinctions. Now, these distinctions, having been drawn by philosophers and logicians, are foreign to most arguers. (Although everyday arguers sometimes employ expressions like 'must' and 'shows conclusively', that does not prove that they understand the above distinctions.) Therefore, many arguments are neither deductive nor inductive.<sup>40</sup>

*Reply.* The objection errs when it asserts that an argument will not be deductive or inductive unless the arguer grasps the distinctions between logical and empirical

connections and between premises' being true and their being properly related to a conclusion. For the purposes of Distinction 4, it is sufficient that an arguer understand the difference between conclusive and inconclusive favorable relevance to the conclusion being attributed to the premises; it is not necessary that he also understand that conclusive favorable relevance is a kind of logical rather than empirical connection, or that he understand that the premises need not be true in order to be conclusively favorably relevant to the conclusion. Similarly, even though a cold sore may be a viral, rather than a bacterial, infection, I may say that someone has a cold sore although I do not understand the difference between viral and bacterial infections.

Moreover, suppose the objection were strengthened to say that many arguers do not understand even what conclusive favorable relevance is, or what inconclusive favorable relevance is, or how the two differ from each other. In light of the amendment to Distinction 4 suggested in the reply to Objections 2 and 3, we could respond that all that is necessary to make someone's argument either deductive or inductive is that he grasp the concept of favorable relevance: if he attributes to his premises nothing more than favorable relevance to his conclusion, that suffices to make his argument inductive. If someone did not understand what favorable relevance is, he could not be an arguer in the first place.<sup>41</sup> Therefore, even if the objection were strengthened in the way described, the distinction between deductive and inductive arguments would still be exhaustive.

*Objection 7.* Even if Distinction 4 satisfies the criterion that it permit both good and bad deductive and inductive arguments, it is neither needed nor helpful in evaluating an argument. For the logical evaluation of an argument involves only actual and not also attributed favorable relevance: it involves ascertaining only whether certain logical relations really hold between the

argument's premises and its conclusion. For instance, to say that an argument is valid is not to say that there is any special relation (like coincidence or inclusion) between the degrees of attributed and actual favorable relevance of its premises to its conclusion but only that its premises entail its conclusion; and to say that an argument is invalid is not to say that any such special relation fails to obtain but only that its premises do not entail its conclusion.<sup>42</sup> Consequently, the logical evaluation of an argument is independent of the degree of attributed favorable relevance of its premises to its conclusion. Such favorable relevance may tell us something about the arguer's state of mind, and it may therefore pertain to the evaluation of the arguer; but it has nothing to do with the evaluation of his argument.<sup>43</sup> Therefore, this way of distinguishing deductive from inductive arguments is useless in evaluating an argument.

*Reply.* I have argued elsewhere that, contrary to the objection, an argument is good with respect to the relation between its premises and conclusion if and only if the actual degree of relevance of its premises to its conclusion either coincides with or falls entirely within the limits of the attributed.<sup>44</sup> I concede that if we know the actual degree of relevance of its premises to its conclusion, knowing in addition whether an argument is deductive or inductive in the sense defined by the present distinction is not always necessary for evaluating the argument. For even without knowing whether it is deductive or inductive, we can know that an argument whose premises are either irrelevant or unfavorably relevant to its conclusion is not good. Despite this concession, however, the objection's conclusion is false. For in other cases we cannot correctly evaluate an argument without knowing whether it is deductive or inductive. For example, knowing that an argument's premises are inconclusively favorably relevant to its conclusion does not tell us whether the argument is good or bad with respect to the relation between its

premises and conclusion unless we know at least whether or not conclusive favorable relevance to the conclusion is attributed to its premises, and that is the same thing as knowing whether the argument is deductive or inductive, according to Distinction 4. So, it is not true that this way of distinguishing deductive from inductive arguments is useless in evaluating arguments.

*Objection 8.* If deductive arguments were distinguished from inductive ones on the basis of the degree of attributed favorable relevance of premises to conclusion, it would follow both that a timid reasoner offering a valid categorical syllogism but claiming that his premises make his conclusion only probable would be offering an argument that is inductive and so ought to be evaluated by the inductive standards that would be appropriate for such arguments as generalizations or analogical arguments, and also that a bold reasoner offering a strong generalization from particular instances but claiming that his premises make his conclusion certain would be offering an argument that is deductive and so ought to be evaluated by the deductive standards that would be appropriate for such arguments as categorical syllogisms and mathematical arguments. The absurdity of these consequences shows that Distinction 4 is faulty.<sup>45</sup>

*Reply 1.* The objection begs the question by assuming a rival position — namely, that an argument is deductive or inductive (or — what would be the same thing for the objectors — ought to be evaluated by deductive or inductive standards) according either to the family to which it belongs (*e.g.*, a categorical syllogism belongs to a family that makes it deductive, whereas a generalization from particular instances belongs to a family that makes it inductive) or to whether the premises are actually conclusively or inconclusively favorably relevant to the conclusion.

*Reply 2.* Distinction 4 does not have the absurd consequences described by the objection. For having ascertained, on the basis of the degree of favorable relevance to

the conclusion attributed to the premises, that an argument is deductive or inductive, one could proceed to evaluate the argument by ascertaining whether the premises actually have the degree of favorable relevance to the conclusion that has been attributed to them. One would ascertain *that* by means of whatever formal or informal criteria pertain to the argument at hand. For instance, if it is a categorical syllogism, one would inquire whether its middle term is distributed, and so on; if it is an analogical argument, one would inquire whether the attributes mentioned only in the premises are relevant to those mentioned in the conclusion, and so on. Having by one means or another ascertained the premises' actual degree of favorable relevance to the conclusion, one could then compare the actual with the attributed degree of favorable relevance of the premises to the conclusion and evaluate the argument accordingly.<sup>46</sup>

*Reply 3.* Assuming (in accordance with the reply to Objection 4 above) that arguments are individuated not only by their premises and conclusions but also by the degree of favorable relevance to their conclusions attributed to their premises, to comply with the objection's implicit recommendation to evaluate someone's argument as if he attributed to his premises a different degree of favorable relevance than he did would be to evaluate a different argument.<sup>47</sup>

*Objection 9.* It is wrong to distinguish deductive from inductive arguments according to degrees of attributed favorable relevance, as does Distinction 4, because doing so improperly permits the conversion of at least some inductive arguments into deductive ones. Such conversion can be accomplished in the following manner. Begin with a text possessing a form like

x. Hence, it is likely that y.

which would express what Distinction 4 would call an inductive argument, because the expression 'Hence, it is likely that' shows that inconclusive favorable relevance to the conclusion, y, is attributed to the premise, x. Now, let 'it is likely that'

become part of the conclusion, so that the argument's conclusion is no longer simply 'y' but 'it is likely that y'. Finally, let 'z' stand for the new conclusion, so that the text now has the form

x. Hence, z.

This would express a deductive argument,<sup>48</sup> and so the conversion of an inductive into a deductive argument is complete.<sup>49</sup>

*Reply.* It is sometimes correct, as the objection assumes, to incorporate into an argument's conclusion an expression like 'it is likely that' in the text above; for some conclusions are propositions that attribute some degree of probability to something. But it is incorrect when the expression is meant to express, or to help to express, the degree of favorable relevance to the conclusion attributed to the premises; for in that case the expression does not constitute part of the conclusion but instead helps to indicate how the premise is supposed to be related to the conclusion. Whether an expression like 'it is likely that' constitutes part of the conclusion or attributes to the premises some degree of favorable relevance to the conclusion, and hence whether its incorporation into the conclusion is correct or incorrect, depends on the argument at hand. When such incorporation is correct, the expression does not initially make the argument inductive according to Distinction 4, so that no conversion from inductive to deductive is possible; and when it is incorrect, it is not proper to import the expression into the conclusion, so that no such conversion is permissible. Therefore, the objection errs when it claims that Distinction 4 permits the conversion of at least some inductive arguments into deductive ones.<sup>50</sup>

*Objection 10.* This distinction has the counterintuitive consequence that there will be inductive arguments that are deductively valid and deductive arguments that are inductively strong.<sup>51</sup>

*Reply.* The counterintuitive character of the consequence arises only from the verbal affinity between 'deductively valid' and 'deductive' and between 'inductively

strong' and 'inductive'. For if we remove these words but retain their meanings, the counterintuitive character of the consequence vanishes, since it now says that there are arguments to whose premises is not attributed conclusive favorable relevance to their conclusions but whose premises are actually conclusively favorably relevant to their conclusions, and that there are other arguments to whose premises is attributed conclusive favorable relevance to their conclusions but whose premises are actually inconclusively favorably relevant to their conclusions;<sup>52</sup> and there is nothing counterintuitive about that.

*Objection 11.* Degrees of attributed favorable relevance of premises to conclusion cannot distinguish deductive from inductive arguments. For (a) degrees of attributed favorable relevance do not divide arguments into two classes, one of which is subject to evaluation only by means of deductive logic, and the other of which is subject to evaluation only by means of inductive logic. For instance, deductive logic is required to evaluate the categorical syllogism

Premise 1. All animals are mortals.

Premise 2. All humans are animals.

Conclusion. All humans are mortals.

regardless of the degree of favorable relevance to the conclusion attributed to the premises. And (b) an argument is deductive if and only if it can be ascertained to be good or bad only by means of deductive logic, and an argument is inductive if and only if it can be ascertained to be good or bad only by means of inductive logic.<sup>53</sup>

*Reply.* The objection's second premise, (b), begs the question by assuming a rival distinction between deductive and inductive arguments. Moreover, (a) falsely assumes that it is possible to evaluate any argument by means of either deductive or inductive logic. For, as I have argued above and elsewhere, not every argument can properly be ascertained to be good or bad with respect to the relation between its

premises and conclusion merely by ascertaining to what degree, if any, its premises are actually relevant to its conclusion.<sup>54</sup> This is, however, the most that deductive or inductive logic can ever ascertain concerning any argument.

*Objection 12.* Distinction 4 is wrong because it has the false consequences that the same argument can be both analogical and deductive and that the same argument can be both an instance of *modus ponens* and inductive. For someone arguing from analogy can attribute to his premises conclusive favorable relevance to his conclusion; and that, according to Distinction 4, would suffice to make his analogical argument deductive. And someone arguing by *modus ponens* can attribute to his premises inconclusive favorable relevance to his conclusion; and that, according to Distinction 4, would make his argument inductive.<sup>55</sup>

*Reply.* This objection begs the question by presupposing a rival distinction (probably Distinction 2 or 3) when it assumes that if an argument is analogical, it cannot be deductive, and that if an argument has the form *modus ponens*, it cannot be inductive.

*Objection 13.* On Distinction 4, some arguments are both deductive and inductive. For instance, the argument

Premise 1. If the plane landed on time,  
he will be at the meeting at  
9 a.m.

Premise 2. He is at the meeting at 9 a.m.

Conclusion. The plane landed on time.  
would be deductive. Yet because the premises, while not entailing the conclusion, do provide some evidence for it, the argument seems also to be inductive.<sup>56</sup>

*Reply 1.* Distinction 4 does not have either of the consequences that this objection attributes to it. Since it distinguishes deductive from inductive arguments on the basis of the favorable relevance to the conclusion that is attributed to the premises, it cannot justify claiming either that the argument above is deductive until the degree

of attributed favorable relevance of the premises to the conclusion is known or that an argument is inductive because its premises are actually inconclusively favorably relevant to its conclusion.

*Reply 2.* The objection gives no reason why the argument would be deductive. If the reason were that the argument has the form of affirming the consequent, which would mean that it belongs to a family of arguments that are deductive, then the objection would beg the question by assuming Distinction 2.

*Reply 3.* The objection begs the question by assuming Distinction 3 when it reasons that because the argument's premises make its conclusion probable, the argument is (or appears) inductive.

*Objection 14.* For application to everyday arguments, Distinction 4 requires that the vocabulary of our language be rich enough to permit arguers to express the degree of favorable relevance to the conclusion that they attribute to their premises. But our vocabulary is not that rich.<sup>57</sup>

*Reply.* On the contrary, the vocabulary of our language is rich enough not only to enable us to distinguish conclusive from inconclusive favorable relevance (e.g., by means of 'proves' as opposed to 'suggests', and 'makes certain' as opposed to 'makes probable') but also to distinguish degrees of inconclusive favorable relevance from each other (e.g., by means of 'makes very probable', 'makes somewhat probable', 'makes the probability 0.7').

To summarize: Although many objections have been leveled at Distinction 4, they are all answerable except for Objections 2 and 3, which require that the distinction be revised to say that deductive arguments are those in which conclusive favorable relevance to the conclusion is attributed to the premises, whereas inductive arguments are the remainder. So revised, the distinction is both exclusive and exhaustive; it permits both good and bad arguments of both kinds; and it is both useful and needed in evaluating at least some arguments.

## V. Distinction 5

Distinction 5 is a modification of the preceding one, since it defines deductive and inductive arguments in terms of the degree of favorable relevance to the conclusion attributed to the premises; but it also incorporates features of Distinctions 2 and 3. According to this distinction, there is a deductive claim and an inductive claim, each of which may be made either by an argument or by an arguer. The deductive claim is that the argument's premises are conclusively favorably relevant to its conclusion; the inductive claim is that the argument's premises are inconclusively favorably relevant to its conclusion. An argument is deductive when and only when the deductive claim is made concerning it; it is inductive when and only when the inductive claim is made concerning it. There are both *prima facie* indicators (called 'deductive indicators') that the deductive claim is made and *prima facie* indicators (called 'inductive indicators') that the inductive claim is made. The significance of calling these indicators '*prima facie*' is that, although none of them is either necessary or sufficient for an argument's being deductive or inductive, if a deductive indicator is present then, other things being equal, the argument is deductive; and if an inductive indicator is present then, other things being equal, the argument is inductive. If other things are not equal (*i.e.*, if at least one deductive and at least one inductive indicator are present), then whether the argument is deductive or inductive depends on the relative weights of the conflicting indicators: "If the balance of inductive indicators outweighs the balance of deductive indicators, then the argument should be judged inductive. If the reverse, then deductive."<sup>58</sup>

Some deductive and inductive indicators are explicit; others are implicit.<sup>59</sup> Explicit indicators are expressions that the arguer uses to show what degree of favorable relevance to the conclusion he attributes to

the premises. For example, 'must' and 'shows conclusively' are explicit deductive, whereas 'likely' and 'suggests' are explicit inductive, indicators.

Implicit indicators are of two kinds. One is the family to which the argument belongs. Categorical syllogisms (the good as well as the bad) constitute one family of arguments, analogical arguments (again, the good as well as the bad) constitute another, and so on. Families of arguments belong to one or the other of two groups, with, for example, categorical syllogisms, truth-functional propositional arguments, and mathematical arguments belonging to one group and analogical arguments and causal arguments to the other. Whether a family belongs to one group or the other is determined by the following criterion: if a family of arguments is such that formal features reveal whether its members satisfy the deductive claim, then that family belongs to the first group; and if a family of arguments is such that formal features reveal whether its members satisfy the inductive claim, then that family belongs to the second group. An argument's belonging to a family in the first group is an implicit deductive indicator; its belonging to a family in the second group is an implicit inductive indicator.<sup>60</sup>

The second kind of implicit indicator is whether it is intuitive and obvious that the premises actually are conclusively or inconclusively favorably relevant to the conclusion. Its being intuitive and obvious that the premises actually are conclusively favorably relevant to the conclusion is an implicit deductive indicator; its being intuitive and obvious that the premises actually are inconclusively favorably relevant to the conclusion is an implicit inductive indicator.<sup>61</sup>

Perhaps the absence of any explicit inductive indicator is itself an implicit deductive indicator. In other words, each argument may carry the presumption (which can be either defeated by explicit inductive indicators or reinforced by other de-

ductive indicators) that the deductive claim is made concerning it.<sup>62</sup>

When deductive and inductive indicators conflict, we might resolve the conflict by means of the rule that “[e]xplicit *prima facie* indicators always take precedence over implicit indicators.”<sup>63</sup> It is reasonable to accept this rule, because it leads to intuitively acceptable consequences. For instance, if we assume the rule, we are led to judge that the argument

Washington was rational.

Lincoln was rational.

Kennedy was rational.

So, all U. S. presidents must be rational.

is a bad argument, in that it is both deductive and invalid; and this judgment is intuitively correct.<sup>64</sup>

Three considerations are advanced in favor of Distinction 5. First, it preserves the traditional distinction between deductive and inductive arguments, endorsing the traditional classification of certain arguments as deductive and of others as inductive. Second, it preserves and harmonizes the preceding three distinctions according to families, actual favorable relevance, and attributed favorable relevance. And third, it accommodates disagreements between people about whether an argument is deductive or inductive; for people may disagree about the weight that should be assigned to conflicting indicators.<sup>65</sup>

To this distinction I shall raise four objections which, jointly at least, warrant not accepting it.

*Objection 1.* There are gaps in Distinction 5's account of the implicit indicators. How can either of the two implicit indicators (namely, the family to which the argument belongs and the intuitiveness and obviousness of the premises' actually being conclusively or inconclusively favorably relevant to the conclusion) be *prima facie* indicators that the deductive or inductive claim is being made concerning that argument? For suppose an argument belongs, say, to the family of categorical syllogisms.

That family belongs to the first group of families, because formal features of categorical syllogisms show whether they satisfy the deductive claim. But how does that indicate, other things being equal, that a *claim* is being made (whether by the arguer or by the argument itself) that the premises are conclusively favorably relevant to the conclusion? Although there are some categorical syllogisms that would satisfy the deductive claim if it were made about them (because their premises are conclusively favorably relevant to their conclusions), there are others that would not. Given only that this argument is a categorical syllogism, then, why is it more likely than not, other things being equal, that the claim is made that this argument is one whose premises are conclusively favorably relevant to its conclusion, rather than one whose premises are not conclusively favorably relevant to their conclusions? Must it be assumed that all or most categorical syllogisms have premises that are claimed to be conclusively favorably relevant to their conclusions? If so, is there sufficient evidence for this assumption? The connection between an argument's belonging to a given family and its being the subject of either the deductive or the inductive claim has not been provided.<sup>66</sup>

And second, suppose an argument's premises are intuitively and obviously inconclusively favorably relevant to its conclusion. How does that indicate, other things being equal, that a *claim* is made that the premises are inconclusively favorably relevant to the conclusion? Although some arguments are such that there is agreement between the attributed and actual degrees of favorable relevance of their premises to their conclusions, others are not. For instance, given only that it is intuitive and obvious that some argument's premises are inconclusively favorably relevant to its conclusion, why is it more likely than not, other things being equal, that the claim is made that this argument is one whose premises are inconclusively favorably rel-

evant to its conclusion, rather than one whose premises are conclusively favorably relevant to its conclusion? Why is it not at least equally likely that, other things being equal, the claim is made that the premises of this argument are conclusively favorably relevant to its conclusion? Must it be assumed that in the case of all or most arguments in which the premises are intuitively and obviously inconclusively favorably relevant to the conclusion there is agreement between the attributed and actual degrees of favorable relevance of the premises to the conclusion? If so, is there sufficient evidence for this assumption? Again, the connection has not been made out.

*Objection 2.* Distinction 5 is subject to two objections already raised against other distinctions. First, it is subject to Objection 2 raised against Distinction 2. For Distinction 5's rationale for assigning a family of arguments to the deductive group or to the inductive group will sometimes warrant assigning it to the other group as well. This would yield mutually inconsistent implicit *prima facie* indicators, neither of which would take precedence over the other. As long as no other, prevailing indicator is present, the result apparently would be that the argument is both deductive and inductive.

Second, Distinction 5 is subject to Objection 2 raised against Distinction 4. For there may be occasions when an arguer explicitly attributes to his premises only favorable relevance, rather than any particular degree thereof. On such an occasion the arguer makes concerning his argument a claim neither identical with nor implicative of either the deductive or the inductive claim. Moreover, on the supposition that an argument is capable of making the deductive or inductive claim about itself, there is no reason why it might not instead make only the claim that its premises are favorably relevant to its conclusion. In either case, according to Distinction 5 the argument would be neither

deductive nor inductive.

*Objection 3.* Both the rule that explicit indicators should take precedence over implicit ones and its defense are problematic. (a) The rule would reduce the potential for disagreement about whether some given argument is deductive or inductive; yet one part of the defense of Distinction 5 is that it accommodates such disagreement. Is such disagreement undesirable (in which case, it is good that the rule reduces it) or not (in which case it may be bad that the rule interferes with its accommodation)? (b) The defense of the rule (namely, that it is acceptable because if accepted it would yield judgments that are intuitively correct) has the logical form of affirming the consequent, and it is controversial whether the premises of arguments of that form confirm (to say nothing of prove) their conclusions.<sup>67</sup>

*Objection 4.* The three points in the defense of this distinction present some difficulties. The first point is that Distinction 5 preserves not only the traditional distinction between deductive and inductive arguments but also the traditional assignment of certain arguments to one class or the other. But what is the "traditional" distinction referred to, and what are the "traditional" assignments? There seem to be three conspicuous possibilities. First, the "traditional" distinction might be Distinction 1, which is based on the generality or particularity of premises or conclusions. Because that distinction has been rejected by most logicians, however, it is doubtful that its conservation would seem desirable. Besides, Distinction 5 does not preserve that distinction's assignment of individual arguments to one class or the other. For an argument that would be, say, deductive according to Distinction 1 because its premises are general while its conclusion is particular might be inductive according to Distinction 5 because the arguer used an expression like 'probably' to express his claim that the premises are inconclusively favorably relevant to the conclusion. And

an argument that would be inductive according to Distinction 1 because its premises are particular while its conclusion is general might be deductive according to Distinction 5 because the arguer used an expression like 'must' to express his claim that the premises are conclusively favorably relevant to the conclusion. So, it does not seem that the preserved "traditional" distinction is Distinction 1. The two remaining possibilities are that the "traditional" distinction referred to is that according to families (Distinction 2) or that according to actual favorable relevance (Distinction 3). But in neither case would Distinction 5 necessarily preserve "traditional" assignments of arguments to one class or the other. For, since Distinction 5 permits the ranking of explicit over implicit indicators, and since it says that both membership in a family and actual favorable relevance are implicit indicators, in some cases an argument may be deductive or inductive because of its explicit indicators and in spite of any implicit indicators of family membership or actual favorable relevance. The only earlier distinction that Distinction 5 preserves is Distinction 4, which was introduced too recently to be traditional.

The second point in the defense of Distinction 5 is that it harmonizes competing Distinctions 2, 3, and 4. But Distinction 5 harmonizes these rival distinctions only by transforming them all from definitions of deductive and inductive arguments to *prima facie* indicators that the deductive or inductive claim is being made: Distinction 2 becomes the implicit indicator of family membership, Distinction 3 becomes the implicit indicator of intuitive and obvious actual favorable relevance, and Distinction 4 becomes the explicit indicator of expressions employed by the arguer. In Objection 1 above I indicated the difficulties in interpreting either of the two implicit indicators as *prima facie* indicators that the deductive or inductive claim is made.

The final point in the defense of Distinction 5 is that it accommodates disagreement about whether some argument is deductive or inductive. There are two reasons why this seems an odd thing to adduce in favor of the distinction. First, as already noted, it is incongruous with the inclusion of the rule assigning precedence to explicit indicators, since that rule reduces, rather than accommodates, disagreement about whether some argument is deductive or inductive. And second, other things being equal, the utility of any distinction is proportional to the extent to which it minimizes, rather than accommodates, disagreement about the things it distinguishes. So, if a distinction between deductive and inductive arguments accommodates disagreements about whether a given argument is deductive or inductive, then, other things being equal, that is not a virtue but a defect of the distinction.

For the reasons set forth in Objections 1-4, I conclude that Distinction 5 should not be accepted.

## VI. Conclusion

Of the five distinctions between deductive and inductive arguments examined here, I conclude that the best is the fourth — an argument is deductive if and only if conclusive favorable relevance to its conclusion is attributed to its premises, and an argument is inductive if and only if inconclusive favorable relevance to its conclusion is attributed to its premises. Although many objections have been raised to it, they are all answerable except for Objections 2 and 3, which require that the distinction be revised to say that an inductive argument is any argument that is not deductive. So revised, this distinction satisfies the criteria set forth earlier in the paper: it is exclusive and exhaustive; it permits both good and bad arguments of each kind; and it is both useful and needed in evaluating at least some arguments.

## Notes

\* My thanks to Thomas E. Gilbert, to my former colleagues in the Philosophy Department at George Washington University, and especially to Mark Vorobej for their many helpful comments on earlier drafts of this paper.

<sup>1</sup> This distinction is sometimes attributed to William Whewell (e.g., by Copi and Cohen [1990:46] and by Weddle [1979:2]). But Whewell (1840:II, xi, 5; Vol. 2, p. 214) not only refers to it as already familiar but also rejects its account of induction as incomplete ([1840:214-215]; see also [1860:XXII, pp. 240, 253-254, 255-256]).

<sup>2</sup> Copi and Cohen (1990:47-48). See also Yanal (1988:86-87).

<sup>3</sup> If it be objected that the premises of this alleged counterexample are singular, rather than particular, propositions, the following argument might be substituted:

Premise. Some women are runners.

Conclusion. Some runners are women.

These are not the only criteria. For instance, the distinction should also be clear rather than obscure and distinct rather than fuzzy.

Not every classification of arguments is related to argument evaluation in this way. The distinction between verificatory and explanatory arguments and the distinction between elegantly and inelegantly expressed arguments are examples.

Barker (1975:59) and Freeman (1984:38).

It might seem that Nicholas Rescher's work on plausible reasoning supports "the idea that there is a third type of reasoning distinctive from deductive and inductive reasoning called *plausible reasoning*..." (Walton [1992:33]). Rescher's approach, however, assimilates plausible reasoning to deductive reasoning, at least for the purposes of evaluation: "The presently envisaged approach to plausible inference thus proposes to *assess the plausibility of a 'merely plausible' piece of reasoning in terms of the plausibility of the added enthymematic premisses needed to transform it into a valid deductive argument.*" (Rescher [1976:60-61]).

<sup>7</sup> The variety and obscurity of C. S. Peirce's distinctions among deduction, induction, and

abduction (or hypothesis, or retrodution) probably explains their neglect in the recent debate with which this paper deals. See Peirce (1958, 1960:1.66-68, 2.267, 2.269, 2.270, 2.515, 2.620, 2.624, 5.145, 6.526, 7.206, 8.209, 8.236).

<sup>8</sup> Fohr (1980a:5), Freeman (1984:38), Machina (1985:572). Arguments may be evaluated logically according to at least the following three criteria: whether their asserted, nonredundant premises are true or acceptable; whether they beg the question; and whether, apart from begging the question, their premises are properly related to their conclusions. When, in this paper, I speak of an argument's being good or bad, it is with respect to this third criterion only.

*Objection.* It is requiring too much of a distinction between deductive and inductive arguments that it permit both good and bad arguments of each kind. It would suffice if it permitted one argument to be better or worse than another.

*Reply.* The main purpose of evaluating an argument is to ascertain whether it is worthy of acceptance. This purpose is advanced by evaluating that argument as good or bad, not as better or worse than another. For given only that one argument is better or worse than another, it remains undetermined whether either ought to be accepted or rejected. It would, therefore, be pointless to require that a distinction between deductive and inductive arguments permit the comparative evaluation of arguments as better or worse yet not require also that it permit the evaluation of arguments as good or bad.

<sup>9</sup> Hitchcock (1981:7): "As practitioners of informal logic, we are oriented towards the appraisal of arguments which people actually advance in an attempt to convince others (or themselves) to believe or do something. The question at issue, then, is whether any version of the distinction between deduction and induction is helpful in appraising arguments. If so, which one?"

<sup>10</sup> *Objection.* Distinction 1 could be made exhaustive either by first defining a deductive argument as one whose premises are general and whose conclusion is particular and then

defining an inductive argument as any that is not deductive, or by first defining an inductive argument as one whose premises are particular and whose conclusion is general and then defining a deductive argument as any that is not inductive.

*Reply.* Either amendment, while yielding an exhaustive distinction, would sacrifice the general-to-particular/particular-to-general symmetry that seems essential to Distinction 1. For example, the first amendment would entail that

Premise 1. All animals are mortals.  
Premise 2. All humans are animals.  
Conclusion. All humans are mortals.

must be an inductive argument, since it does not fit the definition of a deductive argument. Likewise, the second amendment would entail that

Premise. Some females are not mothers.  
Conclusion. Some mothers are not females.

is deductive, since it does not fit the definition of an inductive argument. An advocate of Distinction 1 would probably reject both of these consequences and conclude that the amendments did not so much preserve as destroy the distinction.

<sup>11</sup> Weddle (1979:4): "It is tempting to say that what distinguishes deductive from inductive arguments is the sections of logic books in which they happen to be found." The clearest presentation of this distinction comes, by adaptation, from Freeman (1983:8-9) and especially (1984:37-38). Although Professor Freeman would reject the distinction as stated above, he incorporates a modification of it in Distinction 5.

<sup>12</sup> Adapted from Freeman (1983:8-9) and (1984:37-38). I am indebted to the author for clarification of his arguments in private correspondence (September 12, 1988). For a different account of what distinguishes the two groups from each other, see F. Johnson (1980:5).

<sup>13</sup> This is not to say that formal features *never* determine whether the premises of arguments of a given family are inconclusively favorably relevant to their conclusions.

<sup>14</sup> See, for example, Freeman (1988:322, 324).

<sup>15</sup> Adapted from Strawson (1959:xiv). This ex-

ample was found by a student, Fred Sandal.

<sup>16</sup> For additional criticisms, see F. Johnson (1980:5).

If my example is objected to, the same point can be made by other means. Let the argument be

Premise. Either descriptive metaphysics has had a long and complicated history or not.

Conclusion. There are and are not new truths to be discovered in descriptive metaphysics.

It has the form

Premise. Either  $p$  or not- $p$ .

Conclusion.  $q$  and not- $q$ .

which determines that the argument's premise is neither conclusively nor inconclusively favorably relevant to the conclusion, so that this argument too would be neither deductive nor inductive.

<sup>17</sup> The argument in this paragraph could also be used against a further revision meant to insure exhaustiveness — namely, 'An argument is deductive if it belongs to a family such that formal features reveal *that* its members' premises are conclusively favorably relevant to their conclusions; otherwise, it is inductive'.

<sup>18</sup> Baum (1981:96), Damer (1980:2), Guttenplan and Tamny (1971:4), Machina (1985:572), Manicas and Kruger (1968:22), Nolt (1984:5-7), M. Salmon (1984:32, 39, 48), W. Salmon (1963:14). See also Brody (1967:62, 66) and Fritz, (1960:127), who distinguish deductive from inductive inferences in terms of actual favorable relevance.

A similar way of distinguishing deductive from inductive arguments says that an argument is deductive if its premises are conclusively favorably relevant to its conclusion; otherwise, it is inductive. (Fritz, [1960:128], Manicas and Kruger [1968:24], and Manicas and Kruger [1976:52].) This would make inductive all arguments whose premises are either inconclusively favorably relevant, irrelevant, or unfavorably relevant to their conclusions, so that there would be no distinction between good and bad (valid and invalid) deductive arguments. (See Objection 2 to Distinction 3.)

<sup>19</sup> Freeman (1984:39).

A similar conclusion follows concerning the following distinction: a deductive argument is one in which conclusive favorable relevance to the conclusion either actually belongs, or at least is attributed, to the premises, whereas an inductive argument is one whose conclusion is empirical. (Barker [1989:258, 260] and Govier [1988:260]). This distinction is neither exclusive nor exhaustive. It is not exclusive, because it implies that the argument expressed in the text

The fact that all papers are written by inhabitants of Earth makes it certain that this paper is written by an inhabitant of Earth.

would be both deductive (since conclusive favorable relevance to the conclusion 'This paper is written by an inhabitant of Earth' both actually belongs, and is attributed to, the premise 'All papers are written by inhabitants of Earth') and inductive (because the conclusion is empirical). The distinction also is not exhaustive, because according to it the argument expressed in the text

The fact that John says that the square of 13 is 169 makes it probable that it is, since John is usually right when it comes to mathematics.

would be neither deductive (since conclusive favorable relevance to the conclusion 'The square of 13 is 169' neither actually belongs, nor is attributed, to the premises 'John says that the square of 13 is 169' and 'John is usually correct when it comes to mathematics') nor inductive (since the conclusion is not empirical).

<sup>20</sup> Barker (1975:62), Fohr (1980a:5-6), Freeman (1984:39), Hitchcock (1980:9), Machina (1985:572), Nolt (1987:419), and Yanal (1988:87).

It would be unreasonable to suggest that, say, those inductive arguments whose premises are, at least to some specified degree, favorably relevant to their conclusions are good, whereas the remainder are bad. For that would mean that inductive arguments whose premises are, to less than that specified degree, favorably relevant to their conclusions are, despite that favorable relevance, to be evaluated as bad, just as they would be if their premises had been irrelevant or unfavorably relevant to their conclusions.

For the theory of argument evaluation as-

sumed here, see Bowles (1991:9-11). And for a probabilistic explication of the notion of relevance employed, see Bowles (1990:65-67).

<sup>21</sup> Fritz (1960:129).

The circularity described in this objection is avoided by at least some other distinctions between deductive and inductive arguments. For instance, on Distinction 4 the argument would be deductive because the expression 'proves that' shows that conclusive favorable relevance to the conclusion is attributed to the premises: the argument's classification would not be contingent on its unexpressed premise's being supplied.

<sup>22</sup> Beardsley (1950:201), Copi and Cohen (1990:49), Fohr (1980a:7), Halverson (1984:5-6), Hurley (1982:21), Moore and Parker (1986:189), Rescher (1964:60), Simco and James (1983:1, 310, 313), and Terrell (1967:10). These writers speak not of attribution in general, as I do here, but of some specific kind of attribution. Beardsley, Copi and Cohen, Rescher, and Simco and James speak of a claim; Terrell speaks of a supposition; Fohr, Hurley, and Moore and Parker speak of an intention; and Rescher speaks of an attempt.

<sup>23</sup> Bowles (1989).

<sup>24</sup> Fohr (1980a:8).

<sup>25</sup> Copi (1986:547), Halverson (1984:5-6), Hurley (1982:29-30), R. Johnson (1987:26), and Simco and James (1983:184).

<sup>26</sup> Govier (1980a:11) and (1987b:30), Hitchcock (1983:109), and Nolt and Rohatyn (1988:21, note 3).

<sup>27</sup> Fohr (1980b:6): "... a person doesn't have to state an intention explicitly, or even be thinking of something, in order to have an intention."

<sup>28</sup> *Contra* Hitchcock (1980:9): "... the only way of detecting such intentions is to notice what the arguer claims."

<sup>29</sup> Patrick J. Hurley (1982:21-22) suggests that if the premises are actually conclusively favorably relevant to the conclusion, "one may usually assume" that the arguer meant them

to be. Both he and Barrie Wilson (1980:262) suggest that, in the absence of verbal clues, we can infer the arguer's intentions from the family to which his argument belongs. For example, if an arguer gives a categorical syllogism, we may assume that he means his premises to be conclusively favorably relevant to his conclusion. But if he gives an analogical argument, we may infer that he means his premises to be inconclusively favorably relevant to his conclusion. (But see Objection 1 to Distinction 5, below.)

<sup>30</sup> Fohr (1980b:6) and Hurley (1982:25) offer different replies to this objection. Fohr says that, in the absence of verbal clues from the arguer, we should, if possible, ask him for clarification. If that is not possible, we should observe the Principle of Charity and classify the argument as deductive if it would be a better deductive than inductive argument, or as inductive if it would be a better inductive than deductive argument. Hurley implicitly admits that the deductive-inductive distinction is not exhaustive when he says that it is an analytical tool and that "... no analytical tool can ever be expected to fit every possible set of circumstances."

<sup>31</sup> Hitchcock (1980:10), Nolt (1987:419-420), and Yanal (1988:87).

<sup>32</sup> See Carney and Scheer (1980:10-11).

*Objection 1.* Such a definition of an inductive argument would be entirely negative. Although it would tell us that an inductive argument is not deductive, it would not tell us anything positive about what all inductive arguments have in common. (Govier [1987a:57] and [1987b:50, 51-2]. See also Govier [1980a:11], [1980b:8], and [1988:260].)

*Reply 1.* It is not necessary for a definition to specify something positive, rather than negative, common to the members of the class being defined. The complement of a class, for instance, can properly be defined negatively.

*Reply 2.* Under the revised definition, inductive arguments would have in common at least what all arguments have in common — namely, that favorable relevance to their conclusions is attributed to their premises. (See Bowles [1989].)

*Reply 3.* Under the revised Distinction 4, common to all inductive arguments would be the

ability to be good with respect to the relation between their premises and their conclusions even if their premises are not actually conclusively favorably relevant to their conclusions.

*Objection 2.* 'Therefore' (like 'so', 'for', 'hence', 'since', and 'because') is a neutral illative, in the sense that when someone says something of the form 'x; therefore, y' he tells us that he believes that 'x' is favorably relevant to 'y' but not that 'x' is conclusively, nor that it is inconclusively, favorably relevant to 'y'. (Allen [1988:60]) According to the proposed revision of Distinction 4, then, if someone were to say, " $x = 7$ ; therefore,  $x^2 = 49$ ", although he would attribute to his premise favorable relevance to his conclusion, he would not attribute either conclusive or inconclusive favorable relevance, so that his argument would be inductive. But it seems at least odd to call this argument inductive, since it is a mathematical argument, in which the premise actually is conclusively favorably relevant to the conclusion; and no arguer of normal competence would attribute to the premise ' $x = 7$ ' anything less than conclusive favorable relevance to the conclusion ' $x^2 = 49$ '.

*Reply.* The objection assumes that when someone uses only a neutral illative like 'therefore', he attributes to his premises only favorable relevance — not conclusive and not inconclusive favorable relevance — to his conclusion. But two kinds of attribution are distinguishable in such a case: (1) what the person attributes explicitly by means of words; and (2) what he attributes tacitly, without expressing his attribution in words. Because 'therefore' is a neutral illative, it is quite true that when someone says something of the form 'x; therefore, y', he explicitly attributes to his premises only favorable relevance — not conclusive and not inconclusive favorable relevance — to his conclusion. Still, he may, and in the case of ' $x = 7$ ; therefore,  $x^2 = 49$ ' surely would, have in mind (but not say) that the premise is conclusively favorably relevant to the conclusion. (See Bowles and Gilbert [1993:256, Reply to Objection 4].) And the attribution that matters for Distinction 4 is that which the arguer has in mind, whether he expresses it (correctly) in words or not. Therefore, on the plausible assumption that someone who said " $x = 7$ ; therefore,  $x^2 = 49$ " would tacitly attribute to his premise conclusive

favorable relevance to his conclusion, it follows that for Distinction 4 such an argument would be deductive, not inductive.

<sup>33</sup> The argument referred to may be good, in the sense that there is agreement between the attributed and actual degrees of relevance of its premises to its conclusion (see the next paragraph in the body of the paper), although it is inductive and its premises are conclusively favorably relevant to its conclusion. For it is inductive because the attributed degree of favorable relevance of the premises to the conclusion is "at least probable", which accommodates certainty, the actual degree of favorable relevance of the premises to the conclusion.

<sup>34</sup> Fohr (1980b:6) responds differently, saying, "When a person utters something which could be construed as an argument but has no intention about the relationship of the premisses to the conclusion then that person has not really expressed a unique argument." This reply seems inapt, since the objection says not that the arguer "has no intention about the relationship of the premisses to the conclusion" but that although he attributes to the premises favorable relevance, he does not attribute to them any specific degree of favorable relevance, to the conclusion.

<sup>35</sup> Bowles (1991:9-11).

<sup>36</sup> F. Johnson (1980:5).

<sup>37</sup> Hitchcock (1981:8).

<sup>38</sup> Fohr (1980b:10). In a similar vein, Mark Vorobej (1992:106) notes that "the very identity of the argument being presented will often rest on just this issue [namely, the strength of the logical link between the premises and the conclusion from the author's perspective]", and Alec Fisher (1990:1) suggests that two arguments are the same "if they make the same commitments".

<sup>39</sup> Machina (1985:573-574, 577, 578). See also Nolt (1987:420): "Intentional definitions may have some use in the psychology of argumentation. But I shall lay them aside, since I am concerned with logic."

<sup>40</sup> Adapted from Govier (1980b:7-8).

<sup>41</sup> See Bowles (1989).

<sup>42</sup> Machina (1985:577): "Properly logical evaluation merely considers whether certain evidentiary relations hold between the premiss set and the conclusion." See also Carter (1977:14), Nolt and Rohatyn (1988:21, note 3), and Weddle (1980:12).

<sup>43</sup> Machina (1985:573-574, 577). See also Hitchcock (1981:8-9).

<sup>44</sup> Bowles (1991:9-11 and 7, Objection 1 and its Reply).

<sup>45</sup> Weddle (1979:2). See also Hitchcock (1980:10) and (1983:109).

<sup>46</sup> *Objection.* Evaluating an argument by comparing the actual with the attributed degrees of favorable relevance of the premises to the conclusion amounts to employing a different standard of evaluation for each argument, which makes the evaluation of an argument independent of whether it is deductive or inductive — contrary to the third criterion.

*Reply.* It is not true that evaluating an argument by comparing the actual with the attributed degrees of favorable relevance of the premises to the conclusion amounts to employing a different standard of evaluation for each argument. For in some arguments (namely, those that would be deductive according to Distinction 4) conclusive favorable relevance to the conclusion is attributed to the premises, so that these arguments would all be evaluated according to the same standard (*viz.*, whether their premises actually were conclusively favorably relevant to their conclusions); and in other arguments (namely, some of those that would be inductive according to Distinction 4) inconclusive favorable relevance to the conclusion is attributed to the premises, so that these arguments would all be evaluated according to the same standard (*viz.*, whether their premises actually were inconclusively favorably relevant to their conclusions.)

<sup>47</sup> Fohr (1980b:7).

<sup>48</sup> See Bowles and Gilbert (1993:256, Reply to Objection 4).

<sup>49</sup> Weddle (1979:3).

<sup>50</sup> Freeman (1983:3-8). See also Hempel (1965:58-59) and W. Salmon (1963:61).

<sup>51</sup> Govier (1980b:7-8). See also Machina (1985:576).

<sup>52</sup> See Fohr (1980b:7).

<sup>53</sup> Machina (1985:575-6).

<sup>54</sup> Bowles (1991:2-6).

<sup>55</sup> Nolt (1987:420). See also DeWitt (1992:9).

<sup>56</sup> Yanal (1988:87).

<sup>57</sup> Govier (1987b:30).

<sup>58</sup> Freeman (1984:34).

In (1988:225-229) Professor Freeman offers a variant of Distinction 5. But inasmuch as it is not clear to me how much of Distinction 5 is to be retained in the variant, and the variant is not as carefully worked out as Distinction 5 (probably because it appears in an elementary textbook), I confine my attention in this paper to the original.

<sup>59</sup> It seems permissible to surmise that explicit indicators are *prima facie* indicators that the arguer is making the deductive or the inductive claim, whereas implicit indicators are *prima facie* indicators that either the arguer or the argument itself is making that claim.

<sup>60</sup> For a detailed explanation why membership in some families is a deductive indicator, whereas membership in others is an inductive indicator, see Freeman (1984:37-38).

<sup>61</sup> The preceding three paragraphs are based on Freeman (1983:8-10) and (1984:36-38). The crucial definitions of deductive and inductive arguments are never stated there but seem to be assumed, especially in the latter essay.

Anticipations of the implicit indicators may be found in Hurley (1982:21-22) and Wilson (1980:262). Hurley suggests that if the premises are actually conclusively favorable to the conclusion, "one may usually assume" that the arguer meant them to be. Both he and Wilson suggest that, in the absence of verbal clues, we can infer the arguer's intentions from the family to which his argument belongs. For example, if an arguer gives a categorical syllogism, we may assume that he means his premises to be conclusively favorably relevant to his conclusion. But if he gives an analogical argument, we may infer that he means his premises to be inconclusively favorably relevant to his conclusion. The status of Distinction 5's second kind of implicit indicator is unclear. In (1983:9) Professor Freeman says, "The fact that an argument is intuitively and obviously deductively

valid or that its premises clearly give good inductive support to the conclusion [*n.b.*:] could be a *prima facie* mark that the argument is deductive or inductive." But later on the same page, without explanation, he drops this indicator from his formulation of Distinction 5.

<sup>62</sup> Freeman (1983:9), (1988:228).

<sup>63</sup> Freeman (1983:9). Although Professor Freeman does not insist on this rule, his position, especially as elaborated in (1984), seems to commit him to it. For it would be implausible to say that an implicit *prima facie* indicator is a better indicator than an explicit *prima facie* indicator of whether the deductive or the inductive claim is made, because the explicit indicator helps to make that claim overtly.

On the same page the author seems to suggest that the first of the two implicit *prima facie* indicators should take precedence over the second. In a case where the premises of a categorical syllogism are actually only inconclusively favorably relevant to the conclusion, he asks rhetorically, "wouldn't the mark that the argument belonged to a traditional deductive family override the mark of the premises supporting the conclusion?"

<sup>64</sup> Freeman (1983:9) and (1984:36).

<sup>65</sup> Freeman (1983:9-10).

<sup>66</sup> *Reply*. The reason why an argument's being a categorical syllogism is a *prima facie* indicator that the claim is made that the premises of that argument are conclusively favorably relevant to its conclusion is that the premises of a categorical syllogism may be conclusively favorably relevant to its conclusion (if the syllogism is valid), or they may fail to be at all favorably relevant to it (if the syllogism is invalid), but they cannot be inconclusively favorably relevant to it. Some categorical syllogisms, in short, are capable of satisfying the deductive claim, but none is capable of satisfying the inductive claim. That is why the fact that an argument is a categorical syllogism creates a presumption that the deductive claim is made concerning it: it could satisfy that claim, but it could not satisfy the inductive claim. Similarly, the reason why the fact that an argument is, say, an analogical argument is *prima facie* evidence that the inductive claim is made concerning it: such an argument could satisfy the inductive claim, but it could not satisfy the deductive claim.

*Rejoinder.* It appears that, on the contrary, some categorical syllogisms can satisfy the inductive claim, and some analogical arguments can satisfy the deductive claim. For example, the categorical syllogism

Premise 1. All murderers of Enoch J. Drebber are men who are more than six feet tall; are in the prime of life; have small feet for their height; wore coarse, square-toed boots; smoked Trichinopoly cigars; came with the victim to the site of the murder in a four-wheeled cab pulled by a horse with a new shoe on its off foreleg; and had a florid face and unusually long nails on their right hands.

Premise 2. All suspects named 'Jefferson Hope' are men who are more than six feet tall; are in the prime of life; have small feet for their height; wore coarse, square-toed boots; smoked Trichinopoly cigars; came with the victim to the site of the murder in a four-wheeled cab pulled by a horse

with a new shoe on its off foreleg; and had a florid face and unusually long nails on their right hands.

Conclusion. All suspects named 'Jefferson Hope' are murderers of Enoch J. Drebber.

or a variant of it, appears to be such that its premises are inconclusively favorably relevant to its conclusion. (See Weddle [1979:3] and Freeman [1983:9].) And the analogical argument

Premise 1. Arnold, Beth, Carl, and Dora are fast runners.

Premise 2. Arnold, Beth, and Carl are runners.

Conclusion. Dora is a runner.

seems to be such that its premises are conclusively favorably relevant to its conclusion. Therefore, it seems, some categorical syllogisms are capable of satisfying the inductive claim, and some analogical arguments are capable of satisfying the deductive claim.

<sup>67</sup> See, for example, W. Salmon (1963:81-84) and (1975:34-35).

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