The second reason for discussing the Victorian H.S.C. at such length was to bring out what seem to me to be the general attitudes to reasoning in our society, and to try to indicate the ways in which this sort of syllabus presupposes and reinforces them. ✳

[Editor's Note: This paper was presented at the 1978 ALTA Conference together with a second paper in which Dr. Richards suggested details of a school curriculum in reasoning. This second paper, entitled "The Fourth R", was published in the Australian Logic Teachers' Journal, Vol. IV, No. 2 (February 1980), pp. 1-10.]

Notes

1. V.U.S.E.B. H.S.C. Handbook, 1978. p. 191.

2. Richards, T.J. The Language of Reason (Sydney, Pergamon, 1978).

3. Ibid.

4. Op.cit. p. 193.

5. Committee on English in the Sixth Form, "English and English Literature in the Sixth Form", V.U.S.E.B. duplicated, June 1978. Quote is from statement of aims, p. 6.

6. Op.cit. p. 9.

7. Ibid.

response

Deduction, Induction and Conduction

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The last issue of this Newsletter featured four articles (2, 5, 7, 10) on the inductive-deductive distinction. Sherlock Holmes would deduce that practitioners of informal logic have a great deal of interest in this topic. Or should that be "induces"? Perhaps a few more words on the topic will be conducive, if not conductive, to more enlightenment.

In what follows, I first try to situate the dispute about the deductive-inductive distinction within the context of the appraisal of arguments. I respond briefly to Samuel Fohr's objections (2) to my position. I then explore through a series of examples Perry Weddle's renewed claim (10) that all carefully drawn arguments are deductively valid. I concede that it is possible to fill out the premises of a traditionally inductive argument in such a way as to make it deductively valid, but argue that in general this requires the addition of premises justifiable only by inductively weak arguments. It is therefore a better strategy in argument appraisal to omit such premises and take the argument to be inductively strong. Consideration of these examples leads naturally to a discussion of Trudy Govier's defense of a third "conductive" standard of appraisal of arguments. I conclude by advancing amended criteria for determining the appropriate logical standard for appraisal of an argument.

I

What is at issue in this debate? 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 to 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?

Usually our purpose in appraising an argument is to come to a decision about whether to accept its conclusion. I use the term "cogent" of an argument which deserves to convince us of its conclusion, i.e., which provides adequate grounds for believing or doing what the conclusion says. I take an argument to be cogent for somebody when and only when (1) that person has justifications which are independent of the conclusion for accepting its premises and (2) the conclusion follows from the premises. Some arguments are potentially cogent. That is, they would be cogent if they were filled out with premises which their author perhaps takes for granted as known background information, accepted normative assumptions, and so forth. The cogency or potential cogency of an argument is a relational property; arguments are cogent or potentially cogent to those people who are in possession of relevant evidence. Furthermore, the appraisal of an argument is both an epistemological and a logical matter.

Roughly three positions on the deductive-inductive distinction have emerged.

(1) Perry Weddle (9, 10) maintains that we should abandon the deductive-inductive distinction. "...some traditionally inductive and some traditionally deductive arguments provide conclusive grounds for their conclusions and some do not." (9, p. 4) The ones that do not are apparently not carefully enough drawn. We should presumably fill out their premises and/or hedge their conclusions so that they become deductive in the sense that "it is absolutely impossible for the premises to be true unless the conclusion is true also." Having made the strength of the conclusion proportional to the strength of the premises, we can evaluate the cogency of the argument by evaluating the acceptability of the premises. There are then two questions to ask about any argument: Does the conclusion follow deductively from the premises? What is the relation of the premises to the world? (9, pp. 4-5)

(2) Samuel Fohr (1, 2) maintains that we should retain the deductive-inductive distinction. Since arguments do not exist in vacuo, but are put forward by persons to convince persons, we should pay attention to the intentions of persons who put them forward. "If a person intends that his premises necessitate his conclusion he is giving a deductive argument. If he intends that his premises render his conclusion probable he is giving an inductive argument." (1, p. 7) Fohr could add: If he intends that his premises be non-conclusively relevant to his conclusion he is giving a conductive argument. And so on. If arguers give no evidence of their intentions, we should ask them whether they intend their premises to provide conclusive or probabilistic (or non-conclusively relevant or ...) support for their conclusion. If we cannot discover an arguer's intentions in this respect, we must construe the argument as ambiguous and test it against both deductive and inductive (and conductive and...) standards. An arguer who has no intentions about the strength of the link between premise(s) and conclusion has not put forward a definite argument. Fred Johnson (7) appears to advocate a variant of this position when he urges that we regard "deductive" and "inductive" as characteristic of arguings (acts of putting forward an argument) rather than of arguments themselves. He wants to revise Fohr's vocabulary in order to avoid misleading our students into the mistake of taking arguments themselves to be deductive or inductive. Since two people can put forward the same argument with different intentions as to the strength of the relation between premises and conclusion, it is the arguing and not the argument which is deductive or inductive. Johnson does not say how seriously we should take arguers' intentions in our appraisal either of their arguings or of their arguments, nor does he commit himself on whether there is a defensible distinction between arguments which are deductively valid and those which are inductively strong. Both Fohr and Johnson, however, are likely to think that arguers' intentions about the strength of the link between premises and conclusion can succeed or fail. If so, they presuppose a prior distinction between two (or more) ways in which the conclusion of an argument can follow from its premise(s). That is, they presuppose a distinction between deductive validity and inductive strength (and perhaps other kinds of link as well).

(3) I maintain that we should retain the deductive-inductive distinction, not as a distinction between types of argument, but as a distinction between types of validity--or, as Trudy Govier (5) puts it, standards of appraisal. An argument is deductively valid if and only if the truth of its premises guarantees the truth of its conclusion; that is, it is impossible for the premises to be true and the conclusion false. The description of a possible state of affairs in which its premises are true and its conclusion false is a refutation of the claim that an argument is deductively valid. An argument is inductively strong if and only if the truth of its premises makes the conclusion probable. To refute a claim that an argument is inductively strong, we must deploy arguments which show

that the conclusion is improbable relative to the evidence contained in the premises. Trudy Govier (5) defends at least one more standard of appraisal, which we might call, after Carl Wellman (11), a conductive standard. An argument is conductively valid if and only if the truth of its premises provides non-conclusive relevant reasons for accepting the truth of the conclusion. It is hard to know how to refute a claim that an argument is conductively valid. I shall suggest later that, if the premises of such arguments are properly filled out, it is not possible to refute a claim to validity for such arguments. The only valid objection to a properly filled out argument for which conductive validity is claimed is an attack on one of its premises.

As several of my critics pointed out (2, 5, 7), in maintaining that there is more than one type of validity, I implicitly commit myself to criteria for determining which standard of validity is appropriate for a given argument. Thus, the distinction between deductive and inductive (and conductive?) arguments reappears as the distinction between arguments for whose appraisal standards of deductive validity are appropriate and those for which inductive standards are appropriate (and those for which conductive standards are appropriate?). I return to this objection at the end of the paper.

II

Samuel Fohr (2) contends that an arguer who has no intentions about the strength of the link between his premises and his conclusion has not expressed a unique or definite argument. I find this an odd view, especially since we experts in the field have not yet reached a consensus as to how many possible types of link there are. Weddle says one, I say two, and Govier says three or more. What is the ordinary person to do who simply wishes to express a definite, unambiguous argument?

Fohr further suggests that people who have no such intentions may be giving reasons rather than giving an argument. I do not understand this distinction. To me an argument is a set of statements one of which is advanced on the basis of the rest. If I give my wife's promise as a reason why she should help me paint the kitchen, I make two statements one of which ("you should help me paint the kitchen") is advanced on the basis of the other ("you promised you would"). We could even put these statements in standard argument format:

> You promised to help me paint the kitchen. Therefore, you ought to help me paint the kitchen.

It seems to me that any case of giving reasons for an action or a belief is an argument which could be put into such a format. If not, we should have some clarification of the distinction.

Perry Weddle (10, p. 12) expresses very well a crucial objection to taking arguers' intentions about the strength of the link between their premises and their conclusion as decisive for the appraisal of their arguments. Typically, he points out, we are not so much concerned to judge the arguer as to judge the argument. We want to come to a

decision about how good a justification the argument gives us for accepting the conclusion. I continue to believe that for this purpose the arguers' intentions are at best of heuristic value in determining which standard of appraisal is appropriate.

III

Perry Weddle (9, 10) maintains that some traditionally inductive arguments become deductive arguments when their conclusions are hedged. By calling them deductive he means that it is impossible for the premises to be true and the conclusion false. The conclusions in question are such probability or likelihood statements as the following: It is 95 per cent probable that a sample randomly selected from this population will have a frequency of members having a certain characteristic within 1.96 standard deviations of the mean sample frequency. It is 95 per cent probable that among Canadian voters with an opinion they are willing to express between 32 and 36 per cent supported the Conservative Party at the time the poll was taken. It is 95 per cent probable that this drug when taken as directed brings symptomatic relief within one week to at least 50 per cent of suffers from this disease. There is a 40 per cent chance of rain today in the Metropolitan Toronto area. Any child born to this couple has a 25 per cent chance of having sickle cell anemia.

What does it mean to say that such probability statements are true? Clearly the probability is not a property of the state of affairs which "it is probable that" introduces. A sample selected from a population either does or does not have a frequency of a certain characteristic within a defined range. The extent of support at a given time for the Conservative Party among eligible Canadian voters willing to express an opinion is a definite percentage, with no probabilities about it. It either will or will not rain in Metropolitan Toronto today. A child born to this couple either will or will not have sickle cell anemia.

We can interpret the probabilities in question in at least two different ways. One is as properties of the situation prior to the occurrence or non-occurrence of the event described in "that" clause. In this sense a probability statement would have an objective truth-value, dependent only on the situation at the time, and an explicitly complete description of the relevant features of the situation would provide conclusive grounds for accepting the truth of the probability statement. The other is as epistemic probabilities, as the degree of confidence which the maker of the statement is entitled to have in the truth of the "that" clause on the basis of the evidence at her disposal. In this sense a probability statement has a subjective truth-value, which can change as new information becomes available. I contend that arguments whose conclusions are probability statements in the first sense have been traditionally recognized as deductively valid. Traditionally inductive arguments have conclusions which, when hedged, become probability statements of the second type. In such cases it is possible for the premises to be true and the conclusion false. Therefore one cannot make such arguments deductively valid

just by hedging the conclusion. One can make them deductively valid by also adding a strong premise. Such a premise, however, may lack any justification at all. Furthermore, it can at best be justified by an inductively strong argument, so we are forced at some point to acknowledge weaker than deductive links in cogent arguments. It seems more straightforward to acknowledge such weaker links in the original argument.

I shall develop the above position in terms of a series of examples. In examining these examples I shall respond to Weddle's defense of his position (10) against my earlier objections (6).

(1) Weddle considers my objection that uncited counter evidence may make the hedged conclusion of a traditionally inductive argument false even though the premises are true. He considers this objection in relation to the following argument:

> Set S consists of 360-member subset
>   A and 6-member subset B.
> Smith will select once at random
>   from S.
> Therefore, Smith is likely to select
>   a member of subset A.

Weddle supposes that the uncited counter-evidence would be knowledge of which individual Smith actually selects. If Smith actually selects a member of subset A, the probability is not 360/366 but 1 that he selects a member of subset A. If Smith actually selects a member of subset B, the probability is not 6/366 but 0 that he selects a member of subset B. In either case, the premises are true but the conclusion false. Weddle deals with this supposed counter evidence in the following way:

> To object to the original argument
> on grounds which apply to the amended
> argument would be an ignoratio elenchi.
> The uncited evidence counts only
> against the amended version. The
> original was deductively valid come
> what may.

I do not understand this response. In the first place, I do not understand what Weddle means by the amended argument. In the second place, if this further piece of evidence is taken by Weddle to make the conclusion false even though the premises are still true, how can he maintain that the original argument was deductively valid? By calling an argument deductively valid he means that "it is absolutely impossible for the premises to be true unless the conclusion is true also". How then can an argument be deductively valid when it is capable of having true premises and a false conclusion?

Actually I am quite prepared to agree that the argument cited by Weddle is deductively valid. My reason for doing so is that I consider the conclusion as a purported statement of the property of the situation at the time of utterance. That is, it reports the present probability (which, to be precise, is 360/366) that Smith will select a member of subset A. Information contemporary with or subsequent to Smith's selection from set S is irrelevant to this probability. Given the truth of the premises of Weddle's argument, this conclusion is true. Furthermore,

no conceivable additional evidence can alter
the truth-value of this statement. In other
words, it is impossible for the premises of
this argument to be true and the conclusion
false.

Weddle's example, therefore, is deductively
valid. However, it is not an argument which
would be traditionally regarded as inductive.
In philosophically sophisticated statistics
texts, where such arguments tend to appear,
it is pointed out that the conclusion about
the characteristics of a sample follows de-
ductively from the premises about the char-
acteristics of a population and about the
randomness of the method of selecting members
of the sample. In real life, of course, no-
body reasons from the characteristics of
populations to the characteristics of samples.
We reason from the characteristics of samples
to the characteristics of populations.

(2) Let us consider, then, some more typical
traditionally inductive arguments with their
conclusions hedged and their premises filled
out. On or about January 15, 1977 the Can-
adian Institute of Public Opinion (i.e., the
Gallup poll), at the request of The Canadian
magazine, surveyed 1,043 "representative
French- and English-speaking Canadians in
interviews across the country." This survey
took place two months after the election of a
provincial government in Quebec committed to
political independence for Quebec. Among the
questions the interviewers asked the 1,043
respondents was the question: Should the
government of Canada negotiate special polit-
ical and economic agreements with Quebec to
try to prevent separation? Of the 1,043 res-
pondents, 47.4 per cent (494) said "yes",
43.6 per cent (455) said "no", and 8.7 per
cent (91) said "don't know". (We were not
told what the remaining three persons said.)
The report of this survey in The Canadian did
not make clear from what population the sam-
ple was drawn; let us assume it was drawn
from eligible Canadian voters living in Canada.
Nor did it make clear how the sample was
selected; it was probably selected on the
basis of stratification and geographical
clustering, but to keep things simple let us
assume that it was obtained by some method
of selection which gave each member of the
population an equal chance of being selected
as one of the 1,043 persons interviewed.
Then, looking up appropriate tables in a
statistics text, we can construct the fol-
lowing hedged argument:

 1,043 respondents were obtained
   from the population of Canadian
   voters living in Canada by simple
   random selection without replacement.
 The population is large enough that
   this procedure has virtually no
   probability of giving results
   different from those obtained
   by random selection with replacement.
 On or about January 15, 1977 an
   interviewer asked each respondent,
   "Should the government of Canada
   negotiate special political and
   economic agreements with Quebec
   to try to prevent separation?"
 Each person interviewed gave his or
   her honest opinion at the time.
 The process of interviewing did not
   alter the opinion that any person
   interviewed had on this question

   at the time the interview began.
 47.4 per cent of those asked this
   question said "Yes".
 Therefore, it is 95 per cent probable
   that on or about January 15, 1977
   between 45.3 and 49.5 per cent of
   Canadian voters living in Canada
   thought the government of Canada
   should negotiate special political
   and economic agreements with Quebec
   to try to prevent separation.

(Incidentally, I made up the numbers in the
conclusion. The important point is that a
carefully hedged conclusion of this sort
would give a 95% or 99% confidence interval.)
To assess whether this argument is deductively
valid, we have to ask whether it is possible
for all the premises to be true but the con-
clusion false. I maintain that it is possible,
and therefore that the above argument is not
deductively valid.

Suppose a rival magazine commissioned an-
other polling organization at exactly the
same time to do a survey by the same method
of public opinion sampling on exactly the
same question. (Such coincidences occur
quite commonly during election campaigns, so
this is not an outlandish example.) Suppose
that this polling organization found that
43.2 per cent of 1,043 randomly selected
respondents said "yes" when asked by an in-
terviewer, and that each person asked gave
his or her honest opinion at the time, an
opinion not affected by the process of in-
terviewing. Then, looking up our tables,
again, we could conclude by a similar argu-
ment to the one set out above that it is 95
per cent probable that on or about January
15, 1977 between 41.2 and 45.2 per cent (say)
of Canadian voters living in Canada thought
the government of Canada should negotiate
special political and economic agreements
with Quebec to try to prevent separation.

We do not need to go into the mathematics
to realize that when we take account of the
evidence embodied in the premises of both
arguments the conclusion of the first argu-
ment will no longer be true. The probability
of the frequency of the indicated opinion
being within the range mentioned will be much
less than 95 per cent. In fact, if we com-
bine the two poll results together to get a
sample twice as large in which 45.3 per cent
of the respondents thought Canada should
negotiate special agreements with Quebec, we
can conclude that it is 95 per cent probable
that between 44.1 and 46.5 per cent (say) of
the population of eligible Canadian voters
living in Canada think Canada should nego-
tiate such special agreements.

The probability in this case is the prob-
ability that the method of selecting the
sample and of calculating the confidence
interval will produce an interval which in-
cludes the population frequency of the char-
acteristic being examined. This probability
is fixed relative to the premises; that is,
given that the premises are true, it is im-
possible for the conclusion to be false.
However, when we apply this probability to an
estimation of the population frequency, as is
commonly done, the probability is not fixed
relative to the premises. New information
alters the probabilities. So any conclusion
about the frequency of the characteristic in

the population, no matter how carefully hedged, does not follow deductively from the premises.

Of course, we can always add the premise, "There is no other information relevant to the distribution of opinion on this question among this population at this time." With this premise added, the argument becomes deductively valid, since the sort of information which would show the conclusion false even though the premises are true is explicitly barred by this new premise. It is this sort of premise which I called "open-ended". Note that adding it does not change the fact that the probability hedging the conclusion is still probability given the "evidence" cited in the premises. It is just that one piece of evidence is of a peculiar sort which precludes any other evidence showing up which has a bearing on the conclusion.

Why shouldn't we add this premise and transform the argument into a deductively valid one? Presumably we are filling out unstated premises as a preliminary towards making an assessment of the argument. We want to find out whether it is cogent. The next step will be to inquire of each premise whether it is justified independently of the conclusion. But any premise strong enough to make a deductively valid argument out of an argument from sample characteristics to population characteristics is incapable of being justified. At least, it can't be justified by a deductively valid argument. All that can be said in support of such a premise is that no other information relevant to the conclusion is available to the person criticizing the argument and that certain (describable) efforts have been made to find such information. In principle, no such set of efforts can exhaust the possibilities. It's better to cut the knot at the place where it most obviously demands to be cut, and to construe the original argument as inductively strong, thus recognizing that new information can make the conclusion false, even though the premises continue to be true.

(3) Let us consider another type of argument whose conclusion is a probability statement. First I give an example of an argument which is deductively valid. Sickle cell anemia, geneticists think, is a single-gene recessive characteristic transmitted according to Mendel's laws of segregation and dominance. That is, a human being has sickle cell anemia if and only if he or she has in each non-sex cell in his or her body the gene for sickle cell anemia (which we might call the sickle cell gene) at a given place in both members of a given pair of chromosomes. A person is a carrier of sickle cell trait if and only if he or she has in each non-sex cell at the appropriate places on the chains of chromosomes one sickle cell gene and one normal gene. A carrier does not have sickle cell anemia. However, two carriers who mate can produce a child with sickle cell anemia. Assume two people, Jim and Mary, are carriers. Then we can construct the following argument:

> Jim and Mary are carriers of sickle cell anemia.
> In reproduction Jim's sperm which have the sickle cell gene have a chance of uniting with a fertile egg equal to that of his sperm with the normal gene.

> Likewise, Mary's eggs which have the sickle cell gene have a chance of being fertilized equal to that of those which do not have the normal gene.
> Sickle cell anemia is a single-gene recessive trait.
> Therefore, if Jim and Mary have a child, that child has a 25% probability of having sickle cell anemia.

This is an argument with a probabilistic conclusion which is deductively valid. That is, it is impossible for the premises to be true and the conclusion false. One can avoid apparent counter-examples based on knowledge after the fact just as we did in the case of the argument about the sample characteristics based on the population characteristics. Suppose, for example, someone does an amniocentesis on Mary's unborn child, conceived by Jim, and discovers that the child has sickle cell anemia. (I believe there is no such test. However, there might be one.) Then the probability that this child has sickle cell anemia is not 25% but 100% (or slightly less, if there is a margin of error in the test). But this objection is beside the point, because the conclusion ascribes a probability as the property of a situation prior to any conception of a child. "It is now 25% probable that, if Jim and Mary do conceive a child in the future, the child will have sickle cell anemia." What happens once Jim and Mary conceive a child is irrelevant to the truth of the statement thus construed.

Such arguments are best construed as arguments from stochastic hypotheses to predictions derived from them. That is, the background of such an argument is a stochastic (probabilistic) theory--in this case, Mendel's theory of the inheritance of single-gene traits. Such a theory I take, in common with a number of contemporary philosophers of science cited by Giere (3), to be a definition of a system. That is, the theory is a definition of a Mendelian inheritance system for a characteristic as one which obeys Mendel's laws of segregation and dominance. Given the state of such a system at any particular time, one can predict for each male-female pair in the system the probability that one of their offspring will have a certain characteristic.

(4) Now let us consider a parallel traditionally inductive argument. A screening program identifies Jim and Mary as sickle cell carriers. A genetic counsellor explains to them what this means and advises them that, if they conceive a child, there is a 25 per cent probability that the child will have sickle cell anemia. We can set out the counsellor's argument as follows:

> Jim and Mary are carriers of sickle cell anemia.
> Sickle cell anemia is a single-gene recessive trait.
> Therefore, if Jim and Mary have a child, there is a 25% probability that this child will have sickle cell anemia.

Is this argument deductively valid? I think not. There are possible states of affairs in which the premises are true and the conclusion false. Suppose, for example, a tech-

nique is developed to make the sperm with the sickle gene immobile while keeping the other sperm alive. Suppose that Mary is artificially inseminated with Jim's sperm after they have been treated in this way, and this insemination produces a pregnancy. Then, if the technique is fully effective, there is no probability that the child thus conceived will have sickle cell anemia. So we have a counter-example in which the premises are true and the conclusion false. The argument is not deductively valid.

What we have done here is to suppose some external interference with the operation of the law of segregation in a Mendelian inheritance system. We have supposed that the real system of inheritance of characteristics is open to external influences, not closed according to Mendel's laws. In order to block such counter-examples, we have to add a stipulation that the system of transmission of characteristics from Jim and Mary to their children is closed under Mendel's laws.

Why not add such a premise? Presumably we are filling out unstated premises as a preliminary towards making an assessment of the argument. We want to find out whether it is cogent. The next step will be to inquire of each premise whether it is justified independently of the conclusion. But any premise strong enough to make a deductively valid argument out of an argument from a stochastic hypothesis to a probabilistic prediction is incapable of being justified. At least, it can't be justified by a deductively valid argument. All that can be said in support of such a premise is that we have no reason to believe that external influences will interfere with the operation of the stochastic system and that certain (describable) efforts have been made to find such reasons. In principle, no such set of efforts can exhuast the possibilities. It's better to cut the knot at the place where it most obviously demands to be cut, and to construe the original argument as inductively strong, thus recognizing that new information can make the conclusion false, even though the premises continue to be true.

(5) Let us consider Weddle's meteorological example. The argument supporting the conclusion that there is a 70% chance of rain today is as follows:

> The data available to us are such-and-such (a low-pressure ridge moving down from the Gulf of Alaska, etc.).
> When the data have been such-and-such in the past, it has rained seven out of every ten times on the day after the data have been such-and-such.
> Therefore, there is a 70 per cent probability that it will rain tomorrow.

This is not very sophisticated science. No well-developed stochastic theory, analogous to Mendel's theory of the inheritance of single-gene recessive characteristics, underlies the meteorologist's forecasts. Unless the "etc." here is an open-ended "etc." which would be impossible to justify (at least deductively), it is possible that the collection of additional data or the formation of more sophisticated theories would

lead to a radical alteration of the probability in the conclusion. That is, it is possible for the premises to be true and the conclusion false. If this is one of those low pressure ridges for which we could in principle now predict (if we had the right theories and the right data) that it was going to change direction, then the probability of rain tomorrow might be as low as 10 per cent, and desultory rain at that. So it would not be that good an idea to take our umbrella.

This is an example of uncited counter-evidence making the conclusion false even though the premises remain true. I would object as before to making the argument deductively valid by adding a premise to the effect that no such counter-evidence is obtainable.

IV

(6) I now turn to an argument which not only illustrates my disagreement with Perry Weddle but also opens up discussion of Trudy Govier's contention (4, 5) that there is at least one additional type of link between premises and conclusion. Consider the following argument:

> I wish to buy a new car.
> The only considerations relevant to my choice of a model are cost, comfort, safety, handling and reliability.
>
> On each of these factors model X is superior to every other model.
> Therefore, all things considered, I should buy model X.

This is a deductively valid argument. That is, it is impossible for the premises to be true and the conclusion false. However, since this is a traditionally deductive argument, it does not count in favour of Weddle's claim that traditionally inductive arguments when carefully formulated are deductively valid. Nor is it an example of a conductively valid argument. It does, however, suggest an analogous argument which Weddle would claim is deductively valid when carefully formulated and Wellman and Govier would classify as conductively valid.

(7) To get a close analogue we could construct an imaginary argument which someone about to buy a new car might use in making up her mind. However, I have chosen a real argument which is a somewhat more distant analogue. It comes from the "News from the World of Medicine" section of the December 1977 Reader's Digest (Canadian edition):

> Don't drink if you're pregnant. According to Dr. Joseph R. Cruse of the University of Southern California, women drinking any alcohol at all may run a risk of irreparable damage to their unborn babies....

This brief excerpt combines an appeal to authority with a good reason for an omission. We might put the argument into standard form and fill out its premises as follows:

> Dr. Cruse says that pregnant women drinking any alcohol at all may risk causing irreparable damage to their babies.

    Dr. Cruse has the expertise required
      to make reliable judgements on
      this question.
    Dr. Cruse is saying what he honestly
      believes.
    Other things being equal, pregnant
      women should not do anything
      which subjects their babies to
      a possible risk of irreparable
      damage.
    Therefore, all things considered, you
      should not drink if you're pregnant.

I add the last premise in order to bring out
what I take to be the logic of such arguments.
Wellman (11) maintains that the validity of
each conductively valid argument is sui
generis, that there is no general form of
argument in terms of which such arguments
are valid. I think, however, that there are
always assumptions in such arguments that the
reasons advanced are relevant to the recom-
mendation drawn from them, and such assump-
tions are best expressed in terms of ceteris
paribus statements. When such tacit premises
are made explicit, arguments of this sort are
always valid. One can only object to them by
questioning the truth of a premise or by
citing additional reasons.

   Incidentally, it would not be fair to this
argument to supply a strong normative premise
which makes it deductively valid. Such a
strong premise would be open to obvious
counter-examples. It is just not true that
no pregnant woman should do anything which
subjects her baby to a possible risk of ir-
reparable damage, no matter what the circum-
stances. A pregnant woman cannot avoid doing
some things which carry a possible risk of
such damage, and nobody is obligated to do
the impossible.

   Now let us consider the strength of the
link between premises and conclusion in the
argument as I expanded it above. Is the
argument deductively valid? Suppose the
premises true, and consider how the conclu-
sion could still be false. Unless "run a
risk" is a reporter's pleonasm, it probably
captures the professor's hesitation about
extrapolating empirical data concerning the
effects of high doses of alcohol on unborn
babies to the effects of low doses. In this
type of research, a linear hypothesis about
the relationship of dose and response is
usually assumed. That is, if consuming 20
ounces of alcohol per day carries a 70 per
cent risk of irreparable damage to an unborn
child, it is assumed that consuming one ounce
of alcohol per week carries a 1/2 of 1 per
cent (70 divided by 20, divided by 7) risk of
irreparable damage to an unborn child. An
alternative hypothesis is that there is a
threshhold dose below which there is no re-
sponse at all. The "may" probably reflects
uncertainty about the truth of the linear hy-
pothesis. The difficulty is that it is al-
most impossible to do a crucial experiment to
decide between the linear and the threshhold
hypothesis. Suppose, however, that such an
experiment is performed, and the threshhold
hypothesis wins out. Then the reason for
drinking no alcohol at all no longer obtains.
Assuming no other reasons for not drinking
alcohol, the conclusion is no longer true.
Again, there may be good reasons for a preg-
nant woman to drink alcohol which override

the possible risk of damage to her unborn
child. (It is hard to think of any, but her
personal enjoyment might be enough to over-
ride a merely possible very remote risk of
minor damage.) So there are at least two
ways in which the premises could be true and
the conclusion false.

   Now we could add further premises to pre-
vent such counter-examples from being con-
structed. We might, for example, add the
assumptions that no further evidence will a-
rise which contradicts Dr. Cruse's assertion.
And we might add the assumption that no com-
peting considerations outweigh the possible
risk of irreparable damage to an unborn child.
But it is impossible to justify the first of
these assumptions, and difficult to justify
the second one. Any such justification would
involve arguments which are not deductively
valid. So on Weddle's theory we would have
to conclude that this is not a cogent argu-
ment. This seems to be the wrong appraisal.
If we could justify the premises of the ex-
panded argument which I set out above, then
we would have a cogent argument which, how-
ever, was not deductively valid. We would
have to recognize that, since the premises
provide non-conclusive support for the con-
clusion, further evidence might arise or
further considerations be appealed to which
would lead reasonable people to reject the
conclusion, even though they still accepted
all the premises of the original argument.

   Perry Weddle might suggest hedging the
conclusion of the argument in order to make
it deductively valid. That is, instead of
concluding that, all things considered, you
should not drink if you're pregnant, the
reporter ought to have proportioned the
strength of his conclusion to the strength
of his premises and concluded that, other
things being equal, you should not drink if
you're pregnant. Here the relativity of the
conclusion to the premises is patent, because
the "other" means "other than what is cited
in the premises". Further reasons for or
against drinking while pregnant could change
the truth-value of this statement. Further-
more, it is not in general possible to hedge
conclusions which are recommendations for
action. In reasoning about what to do, we
are interested in coming to a decision about
what to do. At some point, we have to make
an "all things considered" judgement and act.
"Other things being equal" conclusions are
not enough. Thus, hedging the conclusion of
such arguments does not make them deductively
valid, nor (in general) is it possible.

   Trudy Govier wishes to distinguish argu-
ments whose premises are nonrelevant to their
conclusion from arguments whose premises make
their conclusion probable. She seems to have
two reasons for making this distinction. In
the first place, following Wellman, she takes
the concept of probability to have its natu-
ral application to the confirmation of em-
pirical hypotheses by supporting evidence.
As such evidence accumulates, and no discon-
firming evidence is found, the probability of
the empirical hypothesis increases. This is
too narrow a range of application, as some of
the examples above indicate. The probability
of an empirical hypothesis like the special
theory of relativity is quite unlike the prob-
ability that a certain percentage of eligible

Canadian voters living in Canada think Canada should negotiate special arrangements with Quebec to prevent it from separating. The probability that an individual randomly selected from a population will belong to a certain subset of that population is something else again. And the probability that it will rain today in Metropolitan Toronto or that a couple's next child will have sickle cell anemia is a probability attaching to the consequence of an empirical stochastic hypothesis. In the second place, Govier argues that it is linguistically unnatural to speak of considerations for or against a certain action as making it probable that one should perform or omit that action. Suppose, for example, that legalizing euthanasia carries a great danger of abuse and that we never know for certain that a person is incurably ill. These two considerations are relevant considerations against legalizing euthanasia, but it is unnatural to say that their truth makes it improbable that we should legalize euthanasia. Likewise, when Quebec Liberal party leader Claude Ryan uses an analogy with the time it takes to raise a family of five to support his claim that Canada has not reached political maturity, it is unnatural to say that this analogy, if it has some force, makes it probable that Canada has not reached political maturity.

Appeals to natural linguistic usage are not very compelling unless they are supported by some rationale. In any living language, the range of application of words is constantly changing. If there is an obvious extension of the range of application of an existing word, why not extend it? What is crucial, therefore, is the reasons why we find it unnatural to extend the meaning of a word, in this case the meaning of "probable". The reasons why the word "probability" seems unnatural in cases where the premises are non-conclusively relevant to the conclusion seems to be that the concept of probability includes a cardinal measure. That is, if we say that something is probable, we can always be asked "How probable?" and be expected to give an answer which is either a percentage figure or a fraction between 0 and 1. (In my examples above, I deliberately included such percentages.) But such responses are impossible in cases where relevant reasons are being given for doing something or relevant criteria are being cited, either directly or through an analogy, in favour of a certain classification of a phenomenon.

We should not exaggerate this difference between cases where the premises would naturally be said to make the conclusion probable and cases where the premises would naturally be said to provide relevant but non-conclusive reasons for accepting the conclusion. If the hypothesis that sickle cell anemia is a single-gene recessive characteristic is confirmed by examination of thousands of family histories, such evidence makes it very probable that the hypothesis is true. But we cannot cardinally measure this probability. We can recognize that an examination of thousands more cases which likewise showed the same pattern of inheritance consistent with the hypothesis would increase the probability. And we can recognize that the discovery of some patterns of inheritance which were highly unlikely on

that hypothesis would reduce the probability. So we can make some ordinal comparisons between the statuses of the hypothesis relative to different bodies of evidence. We cannot make ordinal comparisons very well between the probability that this hypothesis is true and the probability that another well-confirmed hypothesis (e.g., that Tay-Sachs disease is a single-gene recessive characteristic) is true.

This is precisely our situation with respect to the sorts of arguments which Govier cites. If we believe that failure to legalize euthanasia would condemn thousands of dying persons to long periods of extreme pain, that would be a competing consideration which would reduce our confidence that we should not legalize euthanasia. If we reflect on the pressures which legalized euthanasia would put on elderly people to consent to being killed in a country where there will be increasing resentment at the burden on its resources represented by an increasingly large proportion of elderly people, that would be an additional consideration increasing our confidence that we should not legalize euthanasia. Of course, we cannot make ordinal comparisons very easily (if at all) between the extent to which the two considerations cited by Govier militate against legalizing euthanasia and the extent to which the possible risk of irreparable damage to unborn children militates against a woman drinking alcohol while she is pregnant. Likewise, if further relevant similarities between raising a family of five and bringing the provinces of a disparate country to political maturity emerge, they would increase our confidence that Canada has not yet reached political maturity. If relevant dissimilarities emerge, such as the fact that some provinces had a history of partial self-government prior to Confederation, they would decrease our confidence that Canada has not yet reached political maturity. Of course, we cannot make ordinal comparisons very easily (if at all) between the extent to which (1) Claude Ryan's analogy between children reaching maturity and a country reaching maturity supports the claim that Canada has not reached political maturity and the extent to which (2) the popular analogy between the possible separation of Quebec from Canada and the possible separation of a woman from her husband supports the claim that there should be a national referendum in which the rest of Canada has the opportunity to reassure Quebec that Canada wishes Quebec to remain within Confederation. In all these respects there seem to be close parallels between the extent to which evidence confirms an empirical hypothesis and the extent to which relevant considerations or similarities support a decision or a classification. It seems difficult to justify making a fundamental distinction between these two types of links between premises and conclusion.

In my view, the important distinction among cogent arguments with regard to the link between their premises and their conclusion is that between those arguments where the truth of the premises guarantees the truth of the conclusion (there is no possible state of affairs in which the premises are true and the conclusion false) and those arguments where the truth of the premises provides non-

conclusive grounds for accepting the conclu-
sion (there is a possible state of affairs in
which the premises are true and the conclusion
false, but the premises make the conclusion
probable or provide relevant reasons in its
favour). In some of the latter sorts of
cases, we can quantify the strength of the
link between premises and conclusion; in
others, we cannot. In either case, we must
recognize that we are dealing with an argu-
ment where not only new information about the
truth-value of the premises but also new in-
formation independent of the truth-value of
the premises but relevant to the conclusion
should lead us to re-examine our acceptance
of the conclusion. Certainly there is a
wide variety of types of argument within the
second broad classification of non-deduc-
tively valid arguments. And the types of
logic appropriate to the assessment of their
validity go far beyond those traditionally
encompassed by texts on inductive logic. If
a difference is to be made among this second
broad class of arguments, it might be on the
basis of the sort of tacit premises which
one normally adds in filling out the ellip-
tical arguments which people present. In
the case of apparently conductive arguments,
these are typically of the form, "Other
things being equal, anything with property A
also has property B." (Property A could be
a criterion for classification or a reason
for doing something or a relevant similarity
between analogous cases.) In the case of
apparently inductive arguments, it is not
appropriate to fill out the premises with
such statements.

V

Let me turn finally to the implications of
a distinction among types of argument valid-
ity for the classification of arguments. If
one maintains that cogent arguments can be
deductively valid or inductively strong (or
conductively valid), then one has to decide
which standard to use in appraising an argu-
ment. This means that one must at least
tentatively classify the argument as deduc-
tive or inductive (or conductive), in the
sense that it is appropriately appraised by
deductive or inductive (or conductive) stan-
dards of validity. In my earlier article I
suggested that this classification should be
done on the basis of the apparent logical
form of the argument. Fred Johnson's com-
ments (7) have convinced me that such an ap-
proach to the classification of arguments is
too rigid and narrow.

I suggest instead that we use a version of
the principle of charity in settling on the
standards by which to assess an argument.
That is, we should assess it by those stan-
dards which give it the best chance of being
a cogent argument. In practice, this means
that we should fill out elliptical arguments
with premises which stand a chance of being
justified and which make the argument deduc-
tively valid or inductively strong (or con-
ductively valid). Now it may be that an ar-
gument will have a roughly equal chance of
being cogent if we fill it out with premises
which enable us to test for deductive valid-
ity and if we fill it out with premises
which enable us to test it for inductive
strength. For example, it might lack cogen-
cy on either interpretation. Or it might be

very cogent on either interpretation. How
are we to classify such an argument? We can
say that it is both deductive and inductive,
or that it is neither. Nothing much hinges
on our decision between these alternatives.
In this sense, I would argue, classifying
arguments as deductive or inductive (or con-
ductive) is at best a tentative matter, one
which does not produce a neat division of
arguments into mutually exclusive and jointly
exhaustive kinds. We do, however, have a
mutually exclusive and jointly exhaustive
division into kinds of standards for ap-
praising the link in an argument between
premises and conclusion. It is this divi-
sion which justifies reference to deduction,
induction and perhaps conduction as distinct
types of reasoning. ✻

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