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An Argument Evaluation Procedure Incorporating Arguer Credibility

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In this paper I will single out for discussion two aspects of what I take to be a user-friendly argument evaluation procedure. "Top billing" will be given to a method for incorporating arguer credibility in the procedure, after which I want to present a solution to a problem arising from regarding conclusion probability as the mathematical product of joint premise probability and inference claim probability.

Very commonly, proposers of argument evaluation procedures (including this writer) have taken the view that the recipient of an argument (H) should evaluate the argument using only information they had prior to the utterance of the argument by the arguer (S).

The need to rely on such prior information is obvious, but the logical person will take into account all information at their disposal that is relevant to making a judgement about the logical merit of an argument. I want to argue that this principle implies the need to take arguer epistemic credibility into account. For example, H ought to regard a particular premise as having a higher probability on some occasion because they regard the arguer as being epistemically trustworthy on the topic.

It might be thought that taking such a step amounts to surrendering some of one's logical or epistemic autonomy. After all, taking a claim to be true on arguer say-so seems to amount to the surrendering of such autonomy. It may, for some, seem to qualify as a "leap of faith", a concept that evokes uneasiness in philosophers, if not contempt.

The position I want to defend is this: logical autonomy requires taking all evidence available to us into account when evaluating claims, and if we know that S is in a position to know that her/his premise is true, this fact counts as indirect evidence for the premise. Sometimes, indeed, all we have to go on is S's expertise.

Consider this example. We are at a plant nursery looking for some nice perennials for our back yard. Our eye is drawn to some pansies, and we ask a busy sales clerk if they are perennials or annuals (pansies come in both versions). She says: "They are perennials.", and rushes off to answer a query by another customer. We personally cannot tell the difference between the two kinds of pansies, and she has given no reason for saying they are perennials. Should we buy some? This is a matter of whether we now believe they are indeed perennials. What information do we have to rely on to conclude they are? We do have some information - we have the clerk's word for it. Is this a good reason? It is if we believe that plant-store clerks are knowledgeable about such matters. If we take this clerk to be reasonably typical in this respect, we can say we have "authority support" for the claim that these flowers are perennials, that this is a sufficient reason to believe that they are. (By "sufficient reason" I do not mean that the premise guarantees the truth of this conclusion. I only mean that it renders conclusion probability high enough to warrant taking it to be true.)

Does this pansy-buying scenario involve a surrender of logical autonomy? No, because we have independent information about the expertise of plant-store clerks. That is, we may have prior experience of the dependability of such people, or we may know that the stores teach their clerks about the properties of the plants they sell. Contrast this scenario with a different one. We go to the store, take an interest in the pansies we see there, and ask another customer whether or not they are perennials, without investigating the background of that person in plant knowledge. Suppose the person says that the plants are perennials. In this case, taking their word for it does amount to surrendering our logical autonomy, and taking a leap of faith that cannot be logically defended. We have no objective basis for assigning credibility to this other person. They may in fact be knowledgeable, but if we have no information about them we are not entitled to assume they do.

The first example suggests that it can be logical and rational to take a claim as true based on someone's say-so. (There are two bases for doing this: either the person is known to have expertise on the topic, or they have observation ("eyewitness") knowledge.) The good critical thinker takes all relevant information available to her/him into account, and one kind is information relating to authority support.

I believe, then, that any adequate evaluation procedure must accommodate the availability of indirect evidence reflecting authority support for premises, and perhaps for inference claims too. In what follows I describe an evaluation procedure that does this.

Suppose someone (S) directs an argument of the form 'P, so C.' to an intended recipient H. Suppose this is, as the form suggests, a single-inference argument with one or more premises. "P" stands for the set of premises intended by S to get H to believe that C.

The first issue for H is whether or not he/she already believes that C. If so, H has no evaluating to do and the process ends.

If H does not already accept C, then H must start out on the argument evaluation process. The first task is to decide whether or not a premise is favorably relevant to C. The standard criterion used is: would coming to believe P make C seem more likely? Since relevance is a matter of semantic content, if H understands the propositions P and C, they are in a good position to take this step correctly. If P appears to H to be irrelevant, H can set it aside without troubling to determine its truth-value. This is what would happen if S's argument represented a typical case of one of the relevance fallacies.

If it is a single-premise argument, H is now finished. S has failed to persuade H to accept C as true. If there is at least one other premise, H completes the above process for it. Let us suppose that there is at least one premise that H regards as favorably relevant to C.

The next step, of course, is to determine what truth-value ought to be assigned to P. H first invokes her/his own previously acquired information to reach a judgment. For several reasons it is desirable to express the outcome of the evaluation process in probabilistic terms, such as: "P is more likely false than true", "P is as likely false as true", "P is more likely true than false", "P is very likely true", etc. If the judgment is highly favorable, such as the last of these, H is logically entitled to accept P as true.

What if the judgment is less positive, such that H is not entitled to accept P as true? Some systems of argument evaluation would have H set P aside, and move to evaluate another premise, if there is one. But this may be ignoring some information H has, information about S's reliability as a source of information on the topic P is about. Such information is only indirect evidence for C because, when appropriate, accepting P as true on the basis of epistemic authority involves an inference step. That is, we reason in this form: S affirms that P, so P.

Probability theory tells us that, given an argument of the above form, we can write:

p(P) = p(S affirms that P) x p(P/S affirms that P)

This can be simplified in the argument evaluation context by noting that p(S affirms that P) = 1, since H knows that P affirms that P from S's having uttered it. We can now write:

p(P) = p(P/S affirms that P)

How do we get a value for the right-hand parameter? Instinctively, some people answer that it represents the reliability of S in the subject area to which P belongs. For example, if S has a "track record" of getting things right 80% of the time, then one might think that the right-hand side value is 0.8. But this would be a mistake. The 0.8 reliability value actually is for the parameter p(S affirms that P/P), the converse of the parameter we are interested in. That is, S affirms that P is true 80% of the time when P is actually true. So how do we establish a value for p(P/S affirms that P)? The answer, of course, is provided by Bayes' Theorem, which for present purposes can be written as:

p(P/S affirms that P) = [p(P)i x R] / [(p(P)i x R) + ((1 - p(P)i) x (1 - R))]

Here R stands for arguer reliability, S's track record on the topic area to which P belongs. The expression "p(P)i" stands for the probability value that H would assign to P using only information H possessed prior to being in receipt of the argument. This is commonly called the "base rate" in statistics.

As is obvious from the algebraic form of the Bayes's Theorem, the challenge we face at this juncture is how to make it practically useful in our argument evaluation procedure. As it stands, the formula is too complex to be used by most of us except by using a calculator. On the other hand, cognitive psychologists have demonstrated that the heuristic approach that we characteristically use as a substitute is not reliable. The most notorious example in the cognitive psychology literature is Tversky and Kahneman's taxicab example.

> "A cab was involved in a hit and run accident at night. Two cab companies, the Green and the Blue, operate in the city. You are given the following data: (a) 85% of the cabs in the city are Green and 15% are Blue, (b) a witness identified the cab as Blue. The court tested the reliability of the witness under the same circumstances that existed on the night of the accident and concluded that the witness correctly identified each one of the two colors 80% of the time and failed 20% of the time. What is the probability that the cab involved in the accident was Blue rather than Green?" Tversky & Kahneman (1982, 156)

Most people give a wildly inaccurate answer to the question, which suggests that we need to rely on a formula, but it must be a very simple one that yields reasonably accurate results.

To create one I calculated values for the Bayes equation for different appropriate pairs of R and p(P)i values, then ran a linear regression analysis to identify a linear function that most closely fitted the calculated values. A surprisingly simple function was found to be reasonably accurate, one with considerable intuitive plausibility. It is this:

p(P) = p(P)i + (R - 0.5)

For convenience, I will call "p(P)i" the "direct support" for P that H has. The "R - 0.5" part will be called the "authority support" for P.

This formula has to be understood in a certain way. First, it can give values greater than 1, but since p(P) cannot exceed 1, we must understand values above this to indicate that p(P) is 1.

Secondly, we do not use it when R is less than 0.5, because then the authority support would be negative, resulting in p(P) being less than p(P)i. This is not an acceptable outcome. If S's reliability is less than 0.5, we simply ignore their testimony and take p(P) to be p(P)i, the value we would give it independently.

Subtracting the 0.5 from R to get the authority support has intuitive appeal. Consider a case in which S's credibility with H is 0.5. This value reflects a judgment that S is correct about claims on the topic half the time, and incorrect half the time. In other words, H might as well flip a coin as listen to S's opinion, which is another way of saying that S's affirming P in itself provides no authority support for P. Thus, we want a formula for p(P) that gives us p(P)i as the value when R is 0.5, and the above one does.

Consider another scenario, one in which H has no pre-existing evidence for or against P, but H is willing to believe P if S affirms it. Here p(P)i is 0.5 for H (as likely true as false), and R is 1. Plugging these values into our formula we get p(P) = 0.5 + (1 - 0.5) = 1, which means that H regards P as true because S says so. This is the result we should expect, so our formula is correct for these two scenarios.

How close to the Bayes' Theorem results are the results using the simplified formula? If we calculate p(P) for any pair of values for $p(P)_i$ and R using the two formulas and round off to one decimal place (0.9, 0.8, etc.), the simple formula will yield a value within one decimal place almost always. (That is, the error is +/- 0.1.) For everyday purposes this is pretty accurate. For example, in the cab example we have p(P)i = 0.15 and R = 0.8. Thus, p(Cab is Blue/S affirms the cab is Blue) = 0.15 + (0.8 - 0.5) = 0.45. The correct value is 0.41. Not bad! A lot better than the 0.8 value most people give when tested.

The simplified formula is least accurate when p(P)i is very high or very low. But when it is high we can accept P as true without taking R into account, so we don't need the formula.

Because of its algebraic form, the simple formula allows us to simply add authority support to the direct support. Thus, if H did not regard the probability of P as high enough to warrant accepting P as true before, the additional authority support might bring P's probability up enough to warrant accepting P. If it does not add enough, then our judgment is that P cannot be used, by itself or in conjunction with other premises, to prove C, since we do not accept P as true.

Often people furnish more than one premise to try to persuade us, so we have to go through the procedure for each one. All unacceptable ones are set aside and we consider the question of whether the remaining premises make C likely enough to accept it as true.

This practice of setting aside premises that cannot be accepted as true has not been the orthodox way of dealing with premises in evaluation systems that use probability values. Heretofore it has not been included in systems I myself have devised, but I have come to regard it as a practically useful and logically legitimate strategy for several reasons.

First, it simplifies the inference evaluation process when one does not accept a premise as true. One discards it, so that deciding if the remaining premises are sufficient to warrant accepting the conclusion is less complex. From this perspective, and pedagogically, the fewer premises the better. And if no premise is acceptable then no inference evaluation need be done.

Secondly, it allows us to deal effectively with what a colleague of mine calls the "Podunk problem". In my 1984 text, I presented the following invented example: "Students at Podunk

University study very little [in their free time]. Most students at Podunk have part-time jobs. Therefore, Podunk students don't learn a lot in college" (1984, 44).

This little argument has the form 'P1. P2. Therefore C.', and can be diagramed in a "V" form, an instance of the convergent pattern. Two logically independent premises are given to prove the conclusion. Now suppose we have to evaluate this argument (perhaps we are thinking of sending one of our children to Podunk and a friend, knowing this, directs this argument to us). Now suppose we know that Podunk is located in a very small town that offers no opportunity for part-time employment. On this basis we regard the second premise as unacceptable.

This situation presents a problem if conclusion probability is regarded as determined by p(P) x p(C/P), where P represents the set of premises and p(P) their joint probability. Taking both premises into account will yield a p(P) value of zero, since p(P) = p(P1) x p(P2), and p(P2) = 0. And with p(P) = 0, p(C) = 0. Thus, we would, using this approach, have to judge the argument as worthless, even though it contains a premise (P1) that we may think is good enough to warrant accepting the conclusion as true. This result is too paradoxical to be acceptable.

In the procedure advocated here, we simply set aside the false second premise and evaluate the inference quality of the revised argument. That is, is the first premise sufficient to get us to accept the conclusion? If I found it was indeed true, I would say "yes".

Now let's look briefly at a three-assertion "chain" argument to see how the "set aside" strategy works in these cases: "Podunk students spend lots of time working at part-time jobs, so they have more money than the average university student. Therefore, they have smaller student loans than the average university student."

This is a chain argument that can be symbolized as 'A, so B. Therefore C.'. Having decided that A is favorably relevant to B, I need to arrive at a truth value judgment of A. If, as before, I find that Podunk University is in a small town with few part-time job openings, I will judge A to be false. Setting A aside, I now have an argument of the form 'B. Therefore C.' Now I need to evaluate B as a premise. This would require a survey of a sample of students, and data on university students elsewhere in the country. If I am unwilling to do the research, then I will be unable to decide whether or not B makes C probable enough to regard C as true. Thus, the argument cannot convince me that C is true. I have, in effect, set B aside also.

Behind the "setting-aside" strategy is the principle that an argument cannot persuade an evaluator to accept its conclusion unless the evaluator decides that at least one of the basic premises and the corresponding inference claim can be taken to be true. While one could reach a judgment, using probability values, that the conclusion can be assigned a certain probability value, this appraisal of the argument is not of much practical interest to the typical argument "consumer" unless the value is high enough to warrant regarding the conclusion as true. This lack of interest might be seen as philistinism by one who wants an appraisal of the logical worth of arguments regardless of their worth, but the other party can defend their evaluation strategy by appealing to its efficiency. Less mental effort and, consequently, less time is expended. And both parties might agree that life is short!

References

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