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An Aristotelian program for teaching argumentation

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Introduction

One of the greatest challenges in teaching an introductory philosophy course is convincing students that there are, indeed, reliable standards for the evaluation of arguments. Too often introductory students criticize an argument simply by contesting the truth of one of its claims. And far too often the only claim in an argument that meets serious objections is its conclusion. For many students, the idea that an argument displays a structure that can be evaluated on its own terms is not very difficult to grasp; however, without a great deal of practice, the idea is grasped only in an abstract way, with insufficient appreciation of how structural problems manifest themselves in concrete arguments, and without the vocabulary for formulating structural criticisms. We have designed a program that helps students develop some appreciation for both the standards of argument assessment and for the function of argumentation. The most conspicuous virtue of this program is that it can be learned quickly, thereby leaving most of the term free to study the traditional, substantive issues that make introductory philosophy so much fun. Additionally, since fundamental concepts such as validity and soundness are put to work from the start, the program yields results that are obvious to students; the immediate rewards, of course, add to the fun.

The system we use is a modified version of Aristotle's syllogistic logic. We don't introduce the terminology of figures and moods, nor do we worry about Existential Import. With the basic logical thinking that we're trying to teach, this only adds technical details while providing no obvious benefits. Also, the logic unit focuses entirely on intermediate inferences, leaving aside immediate inferences (along with the square of opposition). What remains after these modifications is a deductive system for the analysis and evaluation of intermediate inferences in terms of distribution and negation rules. Without formally studying the principles of immediate inference, students may not be able to translate very sophisticated arguments, but consideration of such arguments is best postponed anyway. Remember, we're speaking of a general introductory philosophy course, not a course devoted exclusively to logic or critical thinking. With this always in mind, the instructor must carefully formulate each exercise so that it makes its point clearly and without unnecessary confusion. Not being held in check by translation difficulties, students are able to move quickly to the evaluation of enthymemes and chain arguments, which is where the normative power of logic can be most impressive.

But this paper is not simply about teaching logic—it's about pedagogy. The introductory philosophy student's inability to recognize argument structure

presents us with a problem that cannot be addressed simply by "teaching logic." The problem that confronts us addresses a fundamental pedagogical concern: Our task is to instill in the student the habit of clear thinking. When we send our students out into the world, we have to make sure that they're prepared for it. This is not simply a matter of providing them with "tools." We've looked at logic that way—and we've approached teaching logic that way—for far too long. Certainly logic may be employed as a tool; it can serve as an incredibly powerful tool, as we who teach it know full well. But it's not logic per se that we should be concerned with in our introductory courses. We want to teach our students how to think clearly and responsibly. There is certainly a moral edge to this view of the situation, and the manner in which we approach our pedagogical concern will not be without further philosophical prejudice. Our pedagogical orientation, as with the technical details of our system, owes much to Aristotle. We have found that giving our students the basics of term logic serves our purpose well. We do not introduce it as a tool for argument analysis—a strong case can easily be made for the superiority of truth-functional logic in that respect—we present it, rather, in the way that a kindergarten teacher brings toys into the classroom. And we make it clear that term logic has limitations—it's not an all-purpose tool. But again, that's not the point. Teaching the basics of term logic pulls the students into a way of thinking that is ordered, directed, and clear. We do not deal with fallacies, for an obvious reason: If you're trying to instill a proper habit, you have to use a proper model. We should not be teaching our students how not to do things. If clear thinking is achieved, fallacious reasoning will be recognizable. Instead of beginning with criticism, we focus first on clarity. We also keep in touch with the content of the arguments: Term logic preserves the content of the arguments in a way that truth-functional logic can only envy, and students appreciate this contact with the real world.

Although the system is derived from Aristotle's term logic, we have made a number of modifications that are designed to meet the needs and abilities of first-year university students. We have identified 5 special constraints and demands of teaching any system of logic in an introductory philosophy course. While it may be possible to satisfy these conditions with another system of deductive logic, we are confident that the program we use is pedagogically superior. Appendix I outlines our reasons for preferring our system to Sentential Logic or Venn Diagramming (we want to focus the presentation on our own program). The five special constraints are as follows:

1 For first-year students, the less that needs to be presupposed the better.

2 It must be broad enough to apply to a wide variety of arguments.

3 It must encourage a systematic grasp of logical principles and concepts.

4 There must be an evaluative component.

5 Instruction must make efficient use of class time.

With judicious use of class time, all of the material can be covered in six hours. Some instructors may prefer to study logic as a self-contained unit (either early in the semester or several weeks into it); others may prefer to study the logic one hour per week over the course of six weeks. (In the next section of the presentation, we will assume that the logic unit consists of six one-hour classes, spread out over two weeks). Now we'll outline the system itself, and offer some strategic suggestions for its introduction. Then we can consider how the system may be supplemented with class discussion of implication, inductive logic, analogical arguments and so-called informal fallacies.

Teaching A Unit of Term Logic

As we all know, when teaching any subject in philosophy, it's necessary to get the students to think clearly on technical matters. This will assist them in discerning the problems and puzzles central to the deeper issues. With logic, it's crucial that students get a clear presentation of the technical apparatus in order to see the deeper issues involved in the justification of inferences. In order to accomplish this, we recommend that translation difficulties be minimized as much as possible. This recommendation applies both to examples discussed in class and to arguments assigned as part of the student's take-home exercises. Also, it is important that the answers for the take home exercises be readily available (on reserve, posted outside the office, circulated with the exercises, etc.) so that students develop some independence with the material and class time can be devoted to the introduction of new material.

Session 1

We begin by exploiting the students' intuitions about logical structure and by drawing attention to the limitations of these intuitions and their bad habits. We outlined the bad habits above: when evaluating an argument, they only consider whether the conclusion of the argument is true. Before the first session begins we write the following arguments on the blackboard:

All men are mortal.

Socrates is a man.

Therefore Socrates is mortal.

Other men die.

I am not another man.

Therefore, I will not die. [from Vladimir Nabokov's *The Pale Fire*]

The first session begins by distinguishing arguments from other forms of prose, namely, exposition (a partial explanation), analysis (a complete explanation) and narration (a chronological sequence of events). If students are

asked to define an argument, they inevitably characterize it as a tool of persuasion. This conventional opinion must be addressed and challenged immediately, but it is not necessary to spend a great deal of time on the task. We suggest to students that a deeper, intrinsic function of an argument is to justify a claim - and that it is because we think the main claim is true that arguments can serve an extrinsic, persuasive function. Premises and conclusions are introduced as the primary components of arguments, and they are explained in connection with coordinating conjunctions and conjunctive adverbs that function as logical connectors ("for," "since," "therefore," etc.). Although the purpose of an argument is to justify a claim, i.e. the argument's conclusion, the grounds for the conclusion are found in the premises.

So far, nothing should strike students as strange or difficult. Now is the time to draw attention to some of their bad habits. We ask them to assess the two arguments on the board. Students generally agree without hesitation that the first argument is good and that the second argument must contain a flaw. But what, exactly, is the flaw in Nabokov's argument? This is when the fun begins. Because the argument's defect is structural, students have difficulty formulating a precise answer to this question. If someone says that the conclusion is false, we point out that the truth of the conclusion ultimately rests on the argument's premises - aren't the premises true? If someone says that the first premise is problematic, we point out that even if the first premise does not tell the whole story, it is true so far as it goes. If someone says that the second premise is problematic, we tease the students: of course I'm not another man, I'm always myself. Students must confront two things at once in this exercise: (1) their intuitive - and in this case reliable - suspicions about Nabokov's argument; and (2) their inability to explain this response. At this point, the technical apparatus of Aristotelian term logic can be introduced as a means for understanding the latent features of familiar thought processes.

The remaining time in the first session is used to outline the method of analysis and the procedures of evaluation for syllogistic arguments. We use the first syllogism as a sample argument and we emphasize the principles of sentence analysis for this session. Declarative sentences are explained in terms of a familiar evaluative criterion: truth; i.e., the mark of a declarative sentence is that it is capable of being true or false. Truth itself need not be explained in great detail (fortunately), but it should be stressed to students that, in arguments, the evaluative function of truth comes into play only in the assessment of premises. Finally, some of the technical apparatus of term logic can be introduced: the distinction between subject and predicate, the copula, quantification (all, some, none), and the four categorical propositional forms ("a," "e," "i" and "o"). At this point students should be able to translate English sentences into proper categorical propositions. For example: "Most basketball players are tall" becomes "Some S are P." Although sentence analysis is the focus of the first class and the first set of exercises, students should be shown what the complete analysis and evaluation of a syllogism looks like; to this end, we analyze the entire sample argument about Socrates' mortality. In the first exercises, students are required to translate the *conclusions* in a set of

syllogisms; in every argument, the conclusion must be clearly indicated by logical connectives.

Note: This is the best time to rehearse the fundamentals of punctuation. We're all sufficiently familiar with the problem of students coming to us with inadequate knowledge of basic English grammar. Right here, at this point in the course, you can solve part of that problem by quickly reviewing the proper and improper uses of the period, comma, semicolon, colon, dash, and apostrophe. It's helpful to include something like Margot Northey's excellent little book, *Making Sense*, in your list of required texts for the course. You can refer the students to it right here. If you have the time and interest, you might also here consider a digression on the philosophy of language, or philology or linguistics. As John Lyons writes (although not entirely accurately) in his *Introduction to Theoretical Linguistics* (Cambridge 1969, p.4): "Traditional grammar, like so many other of our academic traditions, goes back to Greece of the fifth century before Christ. For the Greeks 'grammar' was from the first a part of 'philosophy.' That is to say, it was part of their general inquiry into the nature of the world around them and of their own social institutions."

Assignment: 15-25 syllogisms with easy to identify conclusions. In the passages used in this unit, the analysis proceeds best when students begin by identifying the conclusion. In addition to giving students some experience at translating sentences into propositional categorical form, the first set of exercises is intended to get them in the habit of orienting their *analysis* of an argument (rather than their *assessment* of it) around the conclusion.

Session 2

In this session you can build on the forms of the categorical proposition to explain two matters: (1) some general considerations about the nature of translation and interpretation; (2) some specific details regarding the technical features of syllogistic arguments.

(1) Students need to understand the purpose and the underlying principles of translating ordinary English into categorical propositional form. The underlying principles of translation can be explained by means of some simple examples. Consider the following set of sentences:

1. Snow is white.

2. La neige est blanc.

3. Schnee ist wiess.

4. All things that are snow (S) are things that are white (P).

Just as (1) can be translated as (2) or (3), so can it be translated as (4) and abbreviated as All S are P. The advantages of using (2) or (3), rather than (1), in France or Germany are obvious. What advantage does the categorical

propositional form promise? Quite simply, the abbreviated version of (4) may be understood to belong to a language that has exactly four sentences; moreover, the logical structure of any English sentence is exposed when it is translated into categorical propositional form. This is a helpful way for students to appreciate what the "meaning" of a sentence is - i.e., as that which survives translation; categorical propositional form preserves the logical meaning of a declarative sentence that has been stripped of its semantic content.

(2) Some features of the syllogism may be operationally defined using the subject/predicate analysis of declarative sentences: major and minor terms, major and minor premises, and the middle term. The most difficult concept of the unit will inevitably be distribution. This topic may be broached now, but the distribution rules for validity can be left until the next session, by which time students will hopefully have won some familiarity with the analysis of the syllogism. Distribution should definitely be introduced systematically, using the following chart:

Universal affirmative: (d) S a P (u)

Universal negative: (d) S e P (d) [commutative terms]

Particular affirmative: (u) S i P (u) [commutative terms]

Particular negative: (u) S o P (d)

Commutation need not be discussed at all, but it may be introduced as a way to speed the translation of universal negative and particular affirmative propositions. At this point, students should be able to identify all the parts of a syllogism.

Special problems with singular propositions and interpretative strategies for dealing with the definite article and proper names should also be covered during this session. Distribution can be used to explain why special problems arise in these cases, and the cases can help clarify what distribution means. The most efficient and effective way to explain how syllogistic analysis works and how interpretive difficulties may be managed is by analyzing and evaluating some carefully crafted examples on the blackboard.

Assignment: A series of arguments for translation into proper syllogistic form and analysis. (See the accompanying exercises. We construct the syllogisms for this set of exercises around the sentences to be translated in the Session I exercises.)

Session 3

In this session, by reference to the rules of validity, the students examine some of the most fundamental concepts of reasoning: truth, validity, soundness, and distribution. The Nabokov argument is worth returning to now, for it can be used to bring out the demonstrative and evaluative power of syllogistic

reasoning. (Some students may have already applied their new methods of analysis and evaluation to this argument, and it may be possible to get a student to put it on the blackboard when the time is right.)

The session opens with the distinction between truth and validity, and both concepts should be explained as components of soundness, for the particular rules of validity for term logic will then provide the students with the conceptual tools with which to grasp these concepts. The Nabokov argument breaks down this way:

Other men die.

I am not another man.

Therefore, I will not die.

All M are P (d) M a P (u)

No S are M (d) S e M (d)

No S are P (d) S e P (d)

The rules of validity make the structural problem with this argument crystal clear: we have a fallacy of illicit major: P is distributed in the conclusion but not in the major premise. At this point, the notion of distribution can be clarified handily. Referring to this example, we point out that while not every member of the class defined by P (i.e., "things that die") is being referred to in the major premise (in which P is therefore undistributed), yet the argument tries to draw a conclusion about every member of the class (and so P is distributed there). The discussion of distribution at this point seems in fact to sharpen the students' logical-intuitive abilities, and perhaps their healthy paranoia: the students, not wanting to walk into a trap, suddenly begin to slow down and focus more clearly on what is actually being stated in each individual proposition before proceeding to the next one. For the rest of this session we analyze and evaluate arguments that violate the rules of validity. So one sample argument must contain an illicit minor term, another an undistributed middle term and another must have unequal negatives. If there is time, one valid but unsound argument can be analyzed as well.

Assignment: A series of arguments for translation into proper syllogistic form and evaluation; students can both apply the rules of validity to the arguments analyzed as part of the Session II exercises and work on new arguments.

Session 4

In this session the importance of clarity and conciseness is brought home to the student. Two syllogisms should be written on the blackboard as examples. The first syllogism should contain an obvious equivocation, and the second should be an enthymeme. The first example can be used to discuss one

technical matter and two important concepts. The technical matter has to do with the number of terms employed in an argument: a syllogism must contain exactly three. The concepts are ambiguity and relevance. The discussion of relevance in the context of the first example leads naturally into how to supply the missing proposition in an enthymeme, the second example. By this time, the sample arguments should look less artificial to students, since many of the arguments used in everyday discourse are elliptical. It is possible to find sample arguments in familiar sources. Now that enthymemes have been introduced, students can see (a) how heavily an author can rely on readers to interpret the gaps in an argument and (b) how much responsibility they have - as readers - to interpret an argument reasonably. You can remind them that the enterprise of argument evaluation will only succeed when a serious effort is made to interpret a line of argument fairly; otherwise, any flaws they detect in an argument could be attributed to their interpretation and not the argument itself.

Assignment: A series of enthymemes.

Session 5

The analysis of lengthy passages containing syllogistic reasoning is effective in demonstrating the scope and power of logical evaluation. We outline a step-by-step procedure that gives students a means for analyzing and evaluating telescoped or chain arguments; if the passages are carefully crafted, students can master the procedure quite quickly. It is possible in one hour to demonstrate the procedure by analyzing and evaluating two different chains, each of which consists of at least three linked syllogisms. The function of extended arguments can be explained in terms of sufficiency, a concept that the student can grasp by seeing how a proposition presented as belonging to one of the linked arguments may also be employed as a premise in another of the arguments. We point out how the main conclusion of the chain is supported by a premise that also requires support. Without a further argument in defense of that premise, we do not have sufficient grounds to accept the main conclusion. Of course, this explanation stretches the meaning of sufficiency beyond its usual limits, but its purpose is get students thinking about the concept, not to convey a definitive account of it. Appendix II outlines a step-by-step procedure for the analysis and evaluation of extended arguments.

Assignments: Several chain syllogisms.

Session 6

This session should examine the limitations of term logic. It has proved useful to consider simple arguments that make use of very basic truth-functional logic (modus ponens, modus tollens, and the hypothetical syllogism are easily enough explained and illustrated). While these can be translated into the form of a categorical syllogism, the awkwardness of doing so is clearly prohibitive. As powerful and precise as term logic can be in many cases, students should

know that the system they have learned has a limited field of application. At this point, however, the battle is already won. The students are actively engaged in the logical analysis and evaluation of arguments. While they do not have an all-purpose system for use in the evaluation of every argument they encounter, they now have a working appreciation for the structural features of argument structure and some of the abstract concepts that are essential for analyzing these features.

It is possible to expand the logic unit to introduce inductive argumentation, arguments by analogy and arguments by hypothesis. Each of these argument modes could be introduced in light of the very strong inferential connection between the premise(s) and the conclusion of deductive arguments; that is, whereas the conclusion of a deductive syllogism purports to follow from the premise(s) with necessity, in other kinds of arguments, the conclusion only follows with probability. However, it is possible – and in our view preferable - to integrate these other forms of argumentation with the course's substantive material; an integrative approach can be used with informal fallacies as well.

Testing

An in-class test is the best way to assess the students' development. The test should include at least one three-proposition syllogism, at least one enthymeme and one chain argument. The test need not focus only on technical matters. The following *consistent* but *invalid* argument can instill one final and important lesson:

Some eligible voters do not vote.

All 18 year olds are eligible to vote.

Therefore, some 18 year olds do not vote.

The argument is analyzed as follows:

Some M are not P. (*u*)MoP(d)

All S are M (d)SaM(*u*)

Some S are not P (u)SoP(d) Invalid (undistributed middle).

Most students expect this argument to be valid, and many are surprised when, upon close analysis, it turns out to be invalid (one excellent student reported that she was having a crisis in the exam room). When taking up the test with the class later, we dwell on this argument, using it to convey two related lessons: (1) just because the conclusion of an argument is consistent with a set of premises, that does not mean that the premises guarantee the truth of the conclusion; (2) not only do the new-found methods of analysis explain their correct intuitions, (as they discovered with the Nabokov argument) but they can also correct their mistaken intuitions.

Appendix I: The Relative Merits of Term Logic and Truth-Functional Logic (handout only - not part of the presentation)

Using the five points listed on p. 2, we shall explain why a logic of terms is desirable in the first place. Term logic does not recommend itself overwhelmingly on each of the five points, but on all five it is at least the equal to sentential logic. Moreover, the points on which it may be more strongly recommended are crucial.

(1) We grant that truth-functional, sentential logic without the apparatus of predicate notation should be accessible to first-year students. The rules of bracketing and the system of notation needed for sentential logic should not present special difficulties for any university students. Moreover, since the sentences themselves are left unanalyzed, inferences can be represented rather intuitively. Term logic, on the other hand, requires students to analyze sentences, but the subject-predicate syntax required for this analysis should be familiar. Additionally, the method of notation and representation needed for the system we want to present does not require using any special symbols. The most difficult new vocabulary that students encounter in our system is "distribution," and it is our experience that the difficulties students have when this concept is introduced resolve themselves after they get a little practice at translating English sentences into proper categorical form. In terms of accessibility, our system is probably the equal to truth-functional logic.

(2) Again, in terms of breadth, the two systems are comparable. Each has its limitations, but this is inevitable given the specialized needs of studying logic as only one part of the term's work—and in terms of class time, only a small part. All the same, term logic has surprising breadth when it is adapted to accommodate enthymemes and chain syllogisms, and the system outlined in our presentation is adapted to do precisely that.

(3) & (4) In its potential for depth and its evaluative power, a system of term logic may be recommended over sentential logic. While these two considerations (depth and evaluative power) are distinct, they are not separable. It is precisely because our system of term logic has such a strong evaluative component that it is able to convey some of the deeper, more difficult concepts of argumentation. Almost from the start, students must make use of such evaluative standards as truth, validity and soundness; it is also possible to incorporate other abstract concepts, such as relevance, consistency and sufficiency. And all of these notions can be introduced, and successfully grasped by the student, in a quite brief presentation.

Sentential logic has pedagogical limitations in an introductory course that can be explained succinctly. If the class studies only the inference rules and leaves out truth-tables, two limitations immediately arise. First, students do not get any practice at *evaluating* arguments, and secondly, students who only derive

proofs are likely to get the impression that all deductive arguments can be made valid—one need only fill in the implied steps between the stated premises and the stated conclusion. Yet in order for a class to study both the inference rules and the truth-tables, a great deal of the class time has to be given over to technical matters, so this strategy has simply to abandon the demand of point 5, that the logic unit of an introductory course be covered efficiently. (We'll ignore the possibility that a class might study truth-tables without studying inference rules.)

(5) We have already expressed doubts concerning the ability of sentential logic to convey the normative dimension of logic in a sufficiently brief period of time. This point is worth stressing: It is important that a logic unit in an introductory course be no longer than is necessary. For two chief reasons, an introductory philosophy course is not the place to examine issues in the philosophy of logic. First, even a superficial treatment of such issues must demand far more time and attention than can be devoted to them as components of merely one part of one course. And second, the excitement of philosophy, for the overwhelming majority of students in any general introductory philosophy course, will always be found in the liveliness and diversity of its issues. The logic component of a course should supplement and foster, not replace, this feature of the course. Furthermore, if logic is introduced properly, students are less likely to get the impression that the arguments offered in response to these issues and problems are verbal trickery. Even if the structure of a particular argument—say, for example, the argument from design—doesn't lend itself to analysis in terms of the system of logic that they have studied, students with some background in logic will at least recognize that there must be some kind of logical structure underlying the argument. The system we outline is designed to instill an appreciation of the fact that all arguments have some kind of structural component, and that this structure may be assessed apart from the argument's content.

What about Venn diagrams?

For three reasons, we do not use Venn diagrams. First, they give students a technique for evaluating arguments, but they give no precise indication of what rule of validity is violated in an invalid argument; the students know that the argument is invalid, but they really don't understand why. Second, the diagrams become unworkable with enthymemes and - especially - chain arguments; you'd need a blackboard the size of Kansas. And third, students inevitably find some of the diagramming rules unintuitive—particularly those having to do with the placement of x's.