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# Whatever Happened to Baby Logic?

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## A. The Retreat of Baby Logic

The title of this essay looks forward to a time when teachers of critical thinking, engaged in pedagogical rumination over their morning cups of tea, may ask themselves why elementary formal logic is no longer included in the content of their courses. In many parts of North America, this scenario is already enacted. Formal approaches to critical thinking, however, still hold sway in isolated pockets of the philosophical academic community. This polemic is directed primarily at those pockets, though it may be of interest to those who have already made the leap to informal logic and beyond, but are interested in exploring the pedagogical motivations for this leap.

"Baby logic" is the somewhat deprecatory name given by philosophers to the courses they teach in introductory formal logic. Though these often contain an informal component, they typically focus on the propositional calculus and first-order predicate calculus. Standard content would be translations of English sentences into symbolism, differences between the logical connectives and their English colleagues (including the paradoxes of material implication), the notion of an axiomatic system, axioms and theorems, derivations (often by a natural deduction system), and such semantic tools as truth-tables and truth-trees. Some courses go as far as completeness and consistency proofs for propositional calculus, though such metalogical excursions are rare. Modal logic is also unusual in this context.

Baby logic, of course, has its uses. Firstly, it is needed as a part of philosophical training, certainly as an introduction to the study of logic proper, but also as a way of grounding an interest in many of the standard problems. The history of philosophy cannot be understood without some formal training. Although I am of the opinion that logic is of little relevance to the successful treatment of philosophical problems, this opinion is controversial, so that logic is required as an aid to understanding contemporary positions too.

Secondly, it is helpful to students who go on to study not philosophy, but mathematics or computing science, and sometimes other disciplines such as theoretical physics or even economics which might incorporate mathematics or computer science.

Thirdly, it is helpful in ways aside from its content to students who would benefit from sheer brainwork of a rigorous and analytical kind. It is difficult to prove the generalizability of formal logic skills to other areas where there is no overlap of conceptual content, but I concede to the logicians that it exists.

My dissatisfaction with baby logic arises only in a certain context, that of introductory courses in critical thinking. As these are rapidly becoming the bread-and-butter of philosophy departments all over North America, it is well to ask whether they provide what the rest of the academic community believes them to provide.

## B. Why is Critical Thinking so Popular?

There are, I think, three reasons for the popularity of critical thinking courses in typical post-secondary curricula. First, they are perceived as promoting educational achievement, through the development of the abilities and attitudes of rational evaluation. Second, they are seen as facilitating "good citizenship", the abilities and attitudes appropriate to participation in representative democracies (Glaser 1985; Sabini & Silver 1985). Third, it is said that the demands of modern social life require, even outside the immediate realm of politics, a critical flexibility of thought and attitude in the face of conflicting lifestyles, information overload and job obsolescence (Scriven 1985; Postman 1985; Daly 1986). The connection between the first reason and the others is clear - "good citizenship" and critical flexibility consist in the exercise in a certain non-academic context of the same skills and tendencies as are demonstrative of rationality in an academic context.

The goal of critical thinking instruction can be characterized in a way which pays tribute to each of the above reasons. Let us say that the aim is to enable the student to approach the ideal of being an autonomous thinker within a community of thinkers. The notion of autonomy captures the importance of independence of thought, of having a point of view which is one's own; that of community emphasises the sense in which independence is constrained by the canons of rationality. This ideal is one which will perhaps be recognised as the goal of all serious academic education (arguably of all education), according to those who practise it most self-consciously. It is characteristic of successful practitioners of any discipline, academic or professional, that they fulfil this ideal. It is also one of the most common complaints about "today's students" that they seem unable to do so.

In many areas of North America, at least, critical thinking courses are receiving great emphasis as a means of addressing the perceived problem that most academic instruction does little to encourage the above ideal. Whether this perception is accurate, what are the causes of the problem and whether critical thinking courses are an adequate response are all difficult questions which cannot be answered here. The question I wish to address is, merely, "To what extent, if any, does the inclusion of baby logic in critical thinking courses further the ideal?".

## C. The Holistic Goal of Critical Thinking Instruction

Let us call the purpose of facilitating the student's growth towards becoming an autonomous thinker within a community of thinkers the "holistic goal of critical thinking instruction." This way of describing it connects it with the liberal arts ideal of "developing the

whole person" and with the Aristotelian notion that education has as much to do with habits and attitudes as with information and technical skills.

The relationship between the holistic goal of critical thinking and the technical skills which are exemplified by the critical thinker has been explored by Richard Paul (1982; and unpublished). Partly as a result of his work, it is now a commonplace among teachers of critical thinking that it is through the student's acquisition of the technical skills of reasoning, and the consequent development of critical attitudes, that the holistic goal is achieved. Critical thinking in the "technical" (or "weak") sense is necessary, but not sufficient, for critical thinking in the "holistic" (or "strong") sense.

It is not difficult to see why this is so when we look at the products of failed critical thinking instruction. If we have taught baby logic, informal logic or critical thinking, we are familiar with the student who might be described as a "logic-chopper". This student has internalised the techniques of the course, but displays a marked lack of restraint in their use. He over-estimates the scope of their application, where this will help to refute another's argument, but under-estimates it in reference to the possibility of self-criticism. This person lacks the balance which is distinctive of the critical thinker.

Closely allied with the logic-chopper is the "myopic", the student who cannot generalize what has been learned in logic or critical thinking class to other academic areas, nor to matters outside the academic life. Examples inside the course are seen as appropriate raw material for the exercise of critical techniques, but when arguments occur elsewhere, they are not recognised as such, or simply not subjected to the same degree of scrutiny.

More common than the above types, but equally deviant from the goal of critical thinking, is the "chromatophobe", who wishes to have everything black and white. Uncomfortable with uncertainty, this person prefers a decisive reaction to an issue posed (even when this is decisively suspending judgment!) to a difficult weighing of conflicting claims to credibility.

To the extent that my caricatures have some basis in reality, all three of these types represent failures in critical thinking instruction (or else flaws in the raw material). Their inadequacies are matters of attitude rather than of technical skill. In my own experience, furthermore, there is a less than perfect correlation between intelligence and their avoidance. I suspect that my experience here is shared by other critical thinking instructors.

However, it seems reasonable to suppose that through appropriate training in the technical skills of critical thinking, and through appropriate discussion about the use of those skills, the attitudinal shortcomings can be overcome. One who thinks about how to use a hammer will generally be in a better position to recognise when and when not to use it. The assumption of more recent directions in critical thinking instruction is that progress towards a better understanding (and hence an adoption) of critical attitudes is maximised by explicit discussion of and practice in those attitudes (Resnick 1987).

## D. Does Baby Logic Fulfil the Holistic Goal?

The burning question, then, is to what extent courses in baby logic contribute to the development of critical thinking as conceived under the "holistic" model. This question is not easy to answer at the present time.

The main problem is that it is an empirical question, and waits upon the results of empirical studies of pedagogical effectiveness. I know of no studies which would help me answer the question. It would not be surprising if none existed, for there are obvious difficulties in operationalizing and measuring highly developed critical thinking attitudes. I would be grateful if anyone could bring such work to my attention, since it would release me from the necessity for the possibly contentious conceptual argument on which I base my answer to the question.

My answer, clearly, is that baby logic is far from the best way to encourage the development of higher-order critical thinking. My argument proceeds from the contention that simple logic is conceptually too barren to allow for the exercise of the attitudes and habits of thought which characterize the developed critical thinker.

The primary reason for this is that at the level of elementary logic all questions are decidable in a determinate fashion. Derivations do not sometimes produce one result, sometimes another; there are not alternative formulations of the truth-table for a particular connective; there are clear ways of distinguishing valid from invalid arguments. What Wittgenstein (1968 ##107-8) calls the "crystalline purity" of logic, a feature it shares with simple mathematics, ensures that there is a single correct answer to every question one might ask. While this feature may disappear when one enters the higher realms of logical inquiry, there is no doubt that it permeates the lower levels.

From the point of view of the student, mastering logic then becomes a matter of learning to apply rules, with in each case a unique correct outcome. There may be room for individual variance in such things as the order of derivation, but this is extremely limited. Most complicating factors, such as ambiguities of interpretation, are filtered out in advance of the application of logical method: they are unanalysable because of the simplicity of logical concepts. The focus is on the perfection of a certain technique, and one which is relatively insensitive to variations in the raw material.

The purity of logic is not without its attractions. The elegance of certain derivations, the curiosity of the differences between truth-functional connectives and their ordinary-language counterparts, the clarity of mathematical precision, all make up a world which can be a delight to the inquiring mind. But it is not the world in which we live. When a logic teacher launches into an explanation of the paradoxes of material implication, a line has been crossed. It is the line which separates her subject from its alleged applicability to reasoning in real life. It is the line which separates fascination with a technique from the development of a rational worldview.

What is required for the development of a rational worldview is a functional understanding of such concepts as plausibility, degree of support and balance of considerations. For these, and concepts like them, are the fulcra about which the evaluation of real-life argumentation turns. To aim at any lesser degree of sophistication in conceptual development is either seriously to underestimate the complexity of argument or to fail to prepare one's students for the life which awaits them. It is to leave oneself open to the charges against Socrates (Stone 1989).

It is the very seductiveness of the simplicity of elementary logic which has the potential to lead students towards the attitudes and habits which typify the deviant critical thinker. Encouraging the search for certainty predisposes the student to be impatient with uncertainty: hence the chromatophobe. When that impatience is manifested in the evaluation of real-life argumentation, we have the logic-chopper. Even if the student remains sensitive to the incongruity of real-life argument and simple logic, the natural effect of emphasis on the latter is the failure to generalize: hence the myopic.

If one were to search for a single word which describes what these deviants lack, a likely candidate would be "judgment". Critical discourse in real life is polychromatic; the ability to distinguish fine hues is judgment; the pretence that such discourse can be evaluated in black-and-white terms cannot be sustained.

## E. How to Save the Bathwater

Having expressed the case for my thesis, I wish to look at some possible rebuttals, and to suggest some conciliatory moves I might be willing to make.

A long time ago, a professor of philosophy for whom I worked as teaching assistant expressed to me the opinion that it was unnecessary to include any informal logic in an introductory course in this area, on the grounds that "all natural arguments are syllogistic." If it were sound, this argument would certainly be powerful ammunition against the position I am here supporting. However, it overlooks some important distinctions. To see why this is so, we need to clarify the original claim.

I think what was meant was that given any plausible explicit argument encountered in real life, one could, by suitable choice of suppressed premisses, reconstruct either a valid syllogistic argument or an argument of the form of a common syllogistic fallacy. There is much to be said for this logical point. The problem is that it fails to justify the conclusion that informal logic is unnecessary.

One reason for this is that there is no guarantee that such a reconstruction would be at all faithful to the intentions of the original arguer. It will very often involve attributing to her universal generalizations, for example, to which she would correctly deny being committed. As a result, unless the argument truly is syllogistically invalid in a simple way, an evaluation based on the reconstruction will stand a very good chance of being entirely irrelevant to the argument put forward by the arguer. Here we can already imagine the logic-chopper in operation.

(It might be worthwhile inserting the parenthetical note that I do not think the present argument is relevant only to cases where the attempted reconstruction is in the form of a deductive syllogism. The same problem arises for attempts involving inductive syllogism, containing restricted generalizations ("Most A ..."); examples of arguments which are resistant to reconstruction as inductive enthymemes are to be found, I suggest, in the realms of analogical and conductive argument as well as certain kinds of practical reasoning.)

The central point is that while all arguments may be syllogistic in the sense of being subject to enthymemic reconstruction, not all arguments are syllogistic in the sense that this reconstruction correctly represents the author's intentions, nor even her unintended commitments. Only if the second sense were applicable would it follow that an adequate evaluation of the argument could be carried out in syllogistic (or quantificational) logic alone. The rebuttal thus appears to be guilty of equivocation.

A second reason is that treating all natural arguments as syllogistic may focus students on inappropriate concepts of argument evaluation. The main fulcra of syllogistic evaluation are formal validity and the truth-value of the premisses. Some natural arguments may be formally invalid, but I should hazard the guess that most faulty natural arguments, if reconstructed syllogistically, would suffer in the main from unacceptable premisses, suppressed or otherwise. It is quite natural that in teaching baby logic we concentrate on the clear-cut assessment of formal validity, leaving truth to empirical science or observation, but this approach leaves the student ill-equipped to deal with the complex, and more common, problems of unacceptability. Informal logic is necessary for these purposes.

The first rebuttal is founded, I think, on a misconception of the very purpose of critical thinking instruction. I would say this is to facilitate the development of the skills of evaluative reason as applicable to the real-life experience of the student. The rebuttal seems to presuppose that it is sufficient to facilitate the understanding of certain formal truths which do not permit of wide application.

A more plausible rebuttal starts from the observation that sometimes people do make argumentative mistakes which are simply truth-functional or quantificational in form. Baby logic provides a way of clarifying the concepts used in the evaluation of these kinds of mistake. Therefore, it seems that it would be foolhardy to ignore the need for students to incorporate these concepts by being introduced to formal logic.

My reaction to this is to suggest that the concepts can be explained and assimilated without recourse to formal techniques. So-called formal fallacies such as affirming the consequent can be explained in natural language, I would suggest, much more efficiently than through the acquisition of familiarity with formal logic. A semi-formal, abbreviational approach has much to recommend it: in this way, too, it is possible to bring in the notion, so important in the discussion of the truth-functional and quantificational aspects of argumentation, of a pattern of argument.

It might be pointed out that explaining deductive patterns of argument in natural language is itself open to my objections about giving students an inappropriate sense of determinateness. My general position is saved, however, by some considerations about pedagogical emphasis. To

familiarize students with propositional and predicate calculus takes a considerable length of time - perhaps a minimum of a month - and must be done in a systematic fashion to be effective: it cannot be done piecemeal. Explaining deductive patterns in natural language can be much quicker, and need not be organized as a block of instructional time; it can instead be interspersed with other material and activities. As a result, the inappropriate attitudinal messages which I fear induce the expectation of determinateness become both fewer and more diffuse. The determinate aspects of argument assessment lose their monolithic character as evaluative paradigms.

Since these aspects can be explained without formal techniques, and since formal techniques bring with them their own problems, it seems to me clear that we must take the informal approach. In this way, too, we shall further the important programme of enabling critical thinking to throw off the shackles of its deductive roots. Neither this result nor this general aim will be surprising to many teachers of critical thinking, but I hope to have provided some insight into their justification, and a word of warning to those who have not yet considered them.

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