

A cautionary note about the teaching of critical reasoning

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Abstract: *Following Kaplan (1966) and Scollon (1997) this paper makes a distinction between contrastive rhetoric, contrastive poetics and contrastive inferencing. From this, it is argued that there are a number of confusions implicit in the teaching of critical reasoning. The paper looks at the construction of inferences in the form of syllogistic reasoning as one form of “critical reasoning”. A number of problems are outlined: 1. the conflation of poetic and inferential form; 2. The 'exposition' problem; 3. The problem of the shifting conclusion; 4. The implied argument problem; and 5. Critical thinking and disciplinary bias.*

Keywords: *critical reasoning, contrastive rhetoric, contrastive inferencing.*

1. Introduction

A key requirement for success in university study is to be skilled in the promotion of *reasonableness* (Ennis, 1985, 1887, 1990). Particularly, this means to be *critical* and *analytical* in one's approach to texts and/or experimental data. It is not much good being merely familiar with the *language* of the academic discourse if one cannot critically evaluate the material in question. Critical thinking is central to academic success. Exactly what 'critically evaluate' and 'analytical' mean, however, are a matter of some debate, even if their desirability within the university context is not (Bailin and Siegal, 2003). Critical thinking—the ability to think critically—is clearly crucial in terms of learning for an unknown future. Indeed, a case could be made that it is *the* fundamental educational ideal (Bailin and Siegal, 2003, p. 188-9).

What is 'critical thinking'? How should we teach it? The claim in this paper will be that there are problems and confusions associated with the teaching of critical reasoning which we have not yet begun to understand or remedy. Indeed, the paper presents grounds for pessimism.

2. Critical thinking in the academic context

Critical thinking is the essence of scholarly debating within all faculties of the university. This is something common to both the “hard” and “soft” sciences and the humanities alike. All disciplines require an ability to argue critically in essays, term papers or dissertations. The rules for using logical arguments in English are tacitly understood and applied by educators and academics when grading student work, and mastery of acceptable critical reasoning is considered to be essential for academic success and failure. Critical thinking, though hard to define, is vital for success at tertiary level (Atkinson, 1997; Bailin and Siegal, 2003; Benesch,

1999). Moreover, skills in critical reasoning are as important for educational success as is mastering linguistic genres associated with particular fields of study and vice-versa—both skills are equally necessary for good academic performance: ‘Poor English and poor argument or analysis [are] inextricably linked’ (Felix and Lawson, 1994, p. 67).

While there is an important link between writing and arguing, the skills required to master both are clearly different. Well-written work can be poorly argued. For students, especially students from non-English speaking backgrounds (NESB) the “spectre” of critical thinking, not writing, is usually their single greatest fear. (Felix and Lawson, 1994, p 67). There is some justification for this fear. All too often lecturers and supervisors of NESB students will complain that students’ work is “all there, but lacking in argument” or that the work “seems to lack a clear critical focus” or, worse still, “is merely descriptive—contains no arguments at all” (Ballard and Clanchy, 1984; Barker, Child, Gallios, Jones and Callen, 1991; Bradley and Bradley, 1984; Samuelowicz, 1987). This is so even for students who have otherwise exceptionally good English expression. Skills in argument and critical thinking are difficult to acquire (Felix and Martin, 1991; see also Biggs and Watkins, 1996.) Of course, such skills are not restricted to such students—most students have trouble analysing and presenting arguments.

3. What is critical thinking?

‘Critical’ does not mean attacking one’s opponent; ‘thinking’ does not exactly amount to a synonym for being receptive to new ideas. Often some of the best critical thinking goes on when new ideas are rejected out of hand—for good reasons, of course. However, even those who criticise “critical thinking” rely on principles of critical thinking to do so (Bailin and Siegal, 2003). Critical thinking can be explained in terms of being *reasonable* or *rational* as I have suggested, but these concepts, in turn, require further explanation. Despite vagueness about what constitutes the enterprise of ‘critical thinking’, there are some general points which can be made about it.

3.1 Critical thinking and logic

The first point is that ‘being critical’ *at least in part* is less a facility with language than a facility with *logic*. Language is, in some interesting sense, the *bearer* of logic—one cannot make logical moves without using a linguistic medium of some sort, though not necessarily a *natural* language. Language and logic are not equivalent notions though they are closely connected. The linguistic medium is, however, secondary to the content of the logical structure being expressed, and one can devise any number of ways of linguistically expressing such a structure without losing the main logical point. Just as the content of the statement ‘it is raining’ can be expressed as ‘Il pleut’, ‘Es regnet’ etc., so a valid logical argument can be expressed with different languages, grammars and even (as is usually the case) with mathematical symbols.

The point here is: when dealing with the logic of thought, the medium is not as important as the *structure* of the thought being expressed and the *inferences* that are being made. Inferences are certainly not reducible in any explanatory sense to language.

3.2 Independence of meaning

A second related point to note is that critical thinking is as much independent of meaning as it is independent of language. The following logical move:

All Masdocks are Pimpletons
This X is a Masdock

Therefore, this X is a Primpleton

uses nouns that are utterly meaningless though it expresses a perfectly valid argument. Critical patterns of thought are, to some degree, independent of *meaning*, even if they may not be independent of the traditional ‘parts of speech’: nouns, verbs and so on. But, likewise, the ‘parts of speech’ in a natural language like English are not essential for critical patterns of thought either. We can remove the language operators here (the verb “to be”, the articles, the quantifier—”all”—and the demonstrative pronouns) replace the nouns with symbols, join the symbols by mathematical connectors (‘Boolean operators’) and the validity of the ‘argument’ remains unchanged. Strangely, though the premises of this argument are unsound because they are nonsensical, this fact does *not* affect the logical validity of the argument overall. That this ‘X’ is a Primpleton *follows* from the premises despite the premises being nonsense. And the ‘conclusion’ would continue to follow from the premises whether there were any Masdocks or Primpletons or not. The logic of the argument is undeniable, it seems, *regardless* of what you think about the premises. In an important sense, such argument structures and inferences are—at least partly—what it means to *do* “critical thinking”. This seems to be so regardless of the content of what it is being expressed or its grammatical structure.

3.3 Having an argument and making inferences

What is meant by ‘critical’ in an academic context is to have supporting reasons for a position which *logically demonstrate* the point being made. This does not necessarily amount to being rhetorically convincing either (though a logically valid inference may *also* being rhetorically convincing). Rather, being able to logically demonstrate some point or other is to be able to devise workable *inferences* from plausible premises to plausible conclusions. It is this process of making plausible argumentative inferences—or, alternatively, being able to spot and criticise bad inferences—that distinguishes the good student from the average or poor student. Students who can demonstrate the ability of doing this largely succeed in academic study; students who cannot demonstrate this ability do not.

Ron Scollon has recently made a distinction between contrastive *rhetoric* and contrastive *poetics*: the former is concerned with differences in *persuasive language use* and its influence on audiences; the latter is concerned with differences in *the structure of poetic form*, or what is sometimes known as Kaplan’s “squiggles” (see Scollon, 1997). In his famous paper, Kaplan argued for 5 distinct rhetorical “profiles”—English, Semitic, Oriental, Russian and Romance—which represented the variety of structural patterns often found in student writing. These profiles were claimed by Kaplan to be marked by linear, coordinate, spiralling, digressive and branching poetic forms (see Kaplan, 1966). Though now seen as widely discredited in the applied linguistics literature (see Mohan and Lo, 1985), the idea that there might be cultural differences in thinking patterns has recently been undergoing a revival in the discipline of psychology—indeed, there is now a branch of psychology—“cross-cultural psychology”—dealing with it, and much creditable empirical evidence in its support (see Peng, Ames and Knowles, 2000; Nisbett, 2003).

A further distinction could be made between contrastive rhetoric and poetics, and what might be called *contrastive inferencing* (i.e., differences in the kinds of logical inferences made). As far as I know, this influence on language learning is not dealt with as closely as it should be. One interesting question is that, given that there seem to be differences in poetic form, and rhetorical language use among different cultures, perhaps there might be also differences in the structure of inferential form. However, interesting though it is, I won’t explore this suggestion here (see Davies, 2001 and 2002 for further discussion on this issue).

4. The conflation of poetic and inferential form

There is an urgent need for student support in exactly *how* to argue and be critical in a manner acceptable in tertiary study. This is especially important for NESB students as there are no available materials *dedicated* to this student group (though there are a lot of materials on “informal logic” for native speakers). Furthermore, current ESL support programs only assist students with their critical English *expression* (*contrastive poetics* in Scollon’s sense); few attempts are made to demonstrate the principles of argument used in the critical university culture (*contrastive inferencing* in my sense). Why is this?

The reason for this is that there is a confusion among educators about what critical thinking is supposed to be (see Atkinson, 1999; Bailin and Siegal, 2003). On the one hand, critical thinking is supposed to be a function of academically acceptable linguistic genre patterns or writing conventions—*contrastive rhetoric*—and, to some extent, it is. On the other hand, among philosophers and mathematicians at least, critical thinking is a function of underlying sub-linguistic inference patterns, patterns which are largely a product of cognitive processing, and have very little to do with rhetorical language styles. In one view, inferences are a function of language use as an adjunct to linguistic operations; in another view, one cannot express inferences except *through* or by means of language. This confusion leads to two prevailing attitudes, which prevent discussion in this area.

One attitude is that improving skills in one area is tantamount to improving skills in the other. (Call this attitude “Assumption 1”). It is assumed by some language teachers, linguists and academics that critical language development in English (i.e., being able to use language such as: “in conclusion”, “therefore”, “it follows” etc) and being able to engage in critical argumentation are the same things. They are not. One can use critical language without being able to construct logically valid inferences. It can be shown, for example, that many uses of “therefore” (and other “conclusion indicator” words) in the hands of NESB students who are well-familiar with the use of such words, are little more than *non sequiturs*. Clearly Assumption 1 is false.

The second prevailing attitude among many language educators is that NESB students will, in assimilating critical genre via the process of studying, overcome the first language (L1) influences which cause difficulties and learn how to argue. (Call this attitude “Assumption 2”). However, quite often this does not happen. Specifically, argument and reasoning skills are not necessarily greatly improved by attention simply to the appropriate language. Were it so then all our international students would be as good at arguing as they are at writing.

5. Further problems teaching critical thinking

There are, I believe, four additional problems in terms of understanding what I have called *contrastive inferencing*—patterns of critical thought. I’ll look at each in turn.

5.1 *The problem of the misleading connector word*

How do we understand the patterns of inference-making in arguments? One way we understand them is by looking at the clues: connector words like ‘therefore’, ‘because’ ‘so’ are good indicators that there is a conclusion on the way. Find the conclusion and work back to find the premises and you have an argument. Words like ‘since’ and ‘assuming that’ are good indicators that there is a premise on the way. Find the premise or premises and work

forward and you have your conclusion. Connector words can be taught by giving students lists such as the following:

Conclusion indicator words

let us conclude that...; we conclude that...; we can conclude that...; concluding...; thus...; therefore...; so...; consequently...; hence...

Premise indicator words

since...; as...; for...; because...; assuming that...; supposing that...; given that...; for the reason that...

But one has to be careful here. The implied ‘premise’ here—that all arguments use connector words (and, by parity, non-arguments do not use connector words)—is unsound. There is an ambiguity in how we use connector words and phrases. Sometimes writer use such words with a strictly *grammatical*—not logical—function (however, statements often have *more* than a grammatical function). Not all collections of statements are arguments because they use connector words. There has to be an inferential *connection* between the premises (an inference) for there to be an argument, and quite often, there is no such connection. Consider the two expressions below:

1. I am a student; *therefore* time is precious
2. All men are mortal and Socrates is man *therefore* Socrates is mortal.

Since both the expressions use the logical connector word “therefore”, it could be said that they both attempt to argue something. But it is fairly clear that there is an inference to a conclusion in expression (2) but there is no conclusion being drawn or inferred in expression (1). In example (1) it isn’t being *concluded* that “time is precious” from the fact that “I am a student”. The connector word has the force of an *explanation*, not an inference. But in example (2) it is being concluded that “Socrates is mortal” from the fact that “All men are mortal and Socrates is a man”. The first example uses “therefore” as a grammatical device, the second example uses “therefore” as a logical device (*more* than a grammatical device); and in so doing, draws an inference from premises to a given conclusion.

I am concerned here with the second usage of such connector words and not the first usage. There are plenty of other examples of non-inferential uses of logical connector words, but these are not under consideration here. In the examples there is no difference in the structure of either rhetorical or poetic form, in Scollan’s sense; however, there is a difference in the structure of *inferential* form. One expression is making a logical inference from premises to a desired conclusion; the other clearly isn’t. Language connectors clearly encode *both* grammatical, inferential and lexical meanings and students need to carefully distinguish them (see Jordan, 1986, for further elaboration on this point).

The point is this: whenever a connector word has a *grammatical*, not logical, use, we do not necessarily have an argument. In an argument—as opposed to a statement—the inference is supposed to establish a *logical connection* (not just any old connection) between the premise(s) and the conclusion. Let’s call this *the problem of the misleading connector word*.

5.2 The exposition problem

The second problem is connected to the previous difficulty: the way people present their arguments is not always so helpful or transparent. This is a problem not so much with connector words necessarily, but with the way that arguments in general are presented. Let us call this *the exposition problem*. The difficulty here is that some arguments may be ambiguous or downright vague even leaving aside questions about connector word usage. What looks like a statement may in fact be an argument—interpreted differently it may be seen as a statement. There are many examples of perfectly ordinary ‘academic’ sentences where you cannot tell whether they express a statement, or present an argument. Take the following:

In a democracy the poor have more power than the rich, because there are more of them

It is not clear whether this is a statement, an assertion, which simply states that the power of the poor is produced by their superior numbers, or an argument which claims that the reason for accepting the conclusion that the poor are powerful in a democracy is the fact that the poor are more numerous. One of the most difficult tasks students encounter is deciding whether they are considering a statement or an argument. Some conditional statements are just that, statements, while other sentences which may appear to express statements actually give arguments. Thus, the sentence:

If men have obtained advantages through past discrimination in their favour, then we may discount men’s advantages when selecting people for jobs.

Clearly, this statement is intended to give a *reason* for discounting men’s advantages in employment, and so should be regarded as presenting an argument in favour of that conclusion, based on the tacitly assumed premise that men have in fact obtained advantages from past discrimination in their favour. It can be rewritten as:

- P1. If men have obtained advantages through past discrimination, then we should discount men’s advantages when selecting people for jobs
- P2. Men have obtained advantages in the past from discrimination in their favour (assumed)
- C. We should discount men’s advantages when selecting people for jobs

Perhaps the academic context of such examples would make their meaning clear; perhaps it wouldn’t. In any case the moral is that students shouldn’t be fooled by indicator words when they are looking for arguments and they shouldn’t assume that lack of indicators means that there is no argument. Nor should they assume that what looks like a statement is, in fact, one. Platitudes enough: but how does one teach the skills to recognise such things?

5.3 The implicit inference problem

The last two examples bring me to a third problem. Premises in arguments are seldom clear-cut. They may not even be in the argument at all, but implied. Consider the following example:

If you want a new car, now is the time and Hindmarsh is the place.

Analysis:

- P1 If you want a new car, now is the time and Hindmarsh is the place (to borrow)
- P2. You do want a new car
- IC. Now is the time and Hindmarsh is the place (to borrow)

- P3. If now is the time to buy a car and Hindmarsh is the place, then you should borrow from Hindmarsh
P4. Now is the time to buy and Hindmarsh is the place
MC. You should borrow from Hindmarsh.

The final conclusion is completely implied as are the second and fourth premises. The intermediate conclusion helps the main conclusion by forming part of the major premise in the second syllogism.

That arguments can have implied premises and conclusions certainly raises difficulties for the non-native speaker in terms of comprehension. Faced with a new ‘argument’ in the course of one’s academic studies, how does one sort out what is tacit and what isn’t? What constitutes the missing pieces of the critical jigsaw? To be able to work out these patterns of inference from very limited initial information seems to require the learner to possess very sophisticated reasoning skills in addition to the language skills needed. Background knowledge about the culture is, of course, needed to an important degree too. One would need to be aware, for instance, that ‘Hindmarsh’ used to be a place that lent money for such things as purchasing new cars. But there seems to be more to it than that. There is nothing obvious about the initial statement itself that guarantees that the pattern of reasoning will follow the way that it does. (However, it seems simply obvious that it does when it is spelt out.) How can students, in particular non-native speakers, acquire this information readily? Let’s call this the *implicit inference problem*.

5.4 The problem of the shifting conclusion

Moreover, even if the information is spelt out—not implied—it does not mean that the inference being made is easy to find, because the pattern may not be in an expected order. In order to ‘see’ the inference, one needs to locate the conclusion, but sometimes this is not easy. What is the conclusion in the following examples?

Every flying animal has wings, so it must be that some mammals have wings, for it is certainly true that some mammals fly.

Analysis:

- All flying animals have wings
- Some mammals are flying animals.
- Some mammals have wings

All students are radicals because they are opposed to cuts in education spending

Analysis:

- All radicals are opposed to cuts in education spending
- All students are opposed to cuts in education spending
- All students are radicals

The woman down the street is a doctor, so she probably drives a Mercedes because 97% of them do.

Analysis:

- 97% of doctors drive a Mercedes
- The woman down the street is a doctor
- The woman down the street (probably) drives a Mercedes

There is trouble ahead. The King is old and has no heir.

Analysis:

If the King is to die, then he needs an heir
The King is old (and soon to die)
The King needs an heir

If the King has no heir, then there is trouble ahead
The King has no heir
There is trouble ahead

It is possible for the conclusion to occur anywhere in an argument. In the second and the last examples, the conclusion is at the beginning of the argument. In the first and third examples it is in the middle. Often conclusions are to be found at the end. This is yet another difficulty that faces the non-native speaker attempting to deal with logical constructions in English: quite often crucial information is not in the place where one expects to find it *even if* the information is made explicit. Let's call this *the problem of the shifting conclusion*.

5.5 Critical thinking and disciplinary bias

A final problem is a more general one which applies to all students, not just those from NESB (in fact, *all* the problems apply to students generally, but particularly so to NESB students). This final problem is the difficulty of seeing the connections between arguments advanced in academic debates and what philosophers call 'paradigms' or 'mental models'—the knowledge/conceptual base which lies behind the particular academic 'tribe' for whom that dispute is important.

Questions such as: "What, in general, counts as a logical inference?" "What, in general, counts as a 'plausible' premise or conclusion?" are questions which cannot be answered *in abstracto*. They must be answered 'inside' the context of a linguistic and, importantly, *logical* community; specifically, the academic culture that regards a given dispute as meaningful. Being able to see this connection is crucial for bridging *any* student into the critical academic culture of learning. For quite often it is an *inability* to see what is logically relevant/plausible that is the reason for academic failure. There are a number of reasons why such questions are difficult to answer.

To take the first question given above: There is often no clear reason why a logical inference can be made in one case and not in another. Often, a logical move is considered 'reasonable' only when movements in academic frontiers allow it. So inferences are dependent, in some crucial sense, on changes in knowledge. (Prior to spherical earth astronomical theories, it did not follow at all that if one part of the earth was in darkness the other side was in light—flat earth theorists simply could not have allowed this inference.)

An answer to the second question—what counts as a plausible premise or conclusion?—is also difficult as it largely depends on subject-specific assumptions: what is plausible in Religious Studies (that Jesus is the son of God, for instance) is not at all plausible in a Philosophy Department. What counts as axiomatic in a biology department (that there is a struggle within nature for survival) is hardly likely to be convincing to Marxist sociologists.

Conclusion

This paper has presented grounds for pessimism in the aim of teaching critical thinking. The examples I have given to demonstrate these problems are contrived and *very simple*. The academic prose students have to deal with at university level magnify the problems ten-fold or even a hundred-fold. How can university lecturers overcome these problems and help students move from being passive absorbers to critical assessors of information? More to the point: given the clear importance of critical thinking to the university context—and the doubtless value of critical thinking in terms of learning for an unknown future—why aren't the problems being addressed with more enthusiasm and dedication?

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Acknowledgements

I would like to thank Kate Chanock and two anonymous reviewers for comments on this paper when it appeared in a earlier draft in the *LASA Conference Proceedings* "Sources of Confusion", La Trobe University (2000). This revised form of the paper also benefited from

comments by two anonymous readers from *HERDSA*. I also acknowledge the use of examples taken from Dr. L. E. Johnson's critical thinking lecture notes (Flinders University)

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