

# Reasoning: Control, not Command

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- 0 The worst mistake that can be made about human thinking, and the mistake most commonly made, is to suppose that thinking intelligently is identical with thinking logically; identical with arguing, identical with reasoning. Reasoning does play a crucial role in thinking, of course. But as crucial is the material reasoned on, and this is not the work of reason.
- 1 The mistake takes a naturalistic form in AI, which sets out explicitly to formulate systems of rules of inference whose use simulates, and might even be the same as, intelligent human thought processes. Hence arises the doctrine that how we think (or how AI savants think that we think) is the arbiter of how we should think; and hence the stupefying subject of non-monotonic logic (or non-logical logic, as it might well be called).
- 2 The mistake is constitutive too of the traditions of critical thinking and informal logic, where it is non-naturalistic and prescriptive. Note the clever use of the conclusion indicator ‘So’ in the last sentence of this passage (H.M. Jones, *An Introduction to Critical Thinking*, 1997, p.2) to indicate that the sentence states the conclusion of a piece of reasoning.

to think critically means that we are able to think in a logical fashion — in straight lines, as it were. One of the hardest skills that all undergraduates have to acquire is being able to think logically and then formulate these logical thoughts into sentences to produce an academic essay. Sentences and paragraphs in an essay have to follow on from each other in a logical sequence. This is part of critical thinking. So titles like *Practical Logic* or *Reasoning* reflect this aspect of critical thinking.

Critical thinkers see arguments everywhere, many of them pretty poor. Critical thinking almost always means the exposure of poor arguments.

- 3 A third area where the mistake in question has a deadly influence is scientific method. It is indisputable that intelligent thinking is involved in science, which is accordingly seen to

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This paper is a brief response to the opening paper ‘Induction: Troublesome Term, Contested Concept’ by Martyn Hammersley at the seminar INDUCTION: FACT OR FANTASY? held at King’s College London on January 9 2002. Thanks are due to Joanna Swann, who organized the seminar.

be replete with argumentation. Countless treatises on scientific method offer expositions of ‘scientific inference’ or ‘scientific reasoning’. This is assumed to be deductive logic in pure mathematics, and inductive logic throughout empirical science.

- 4 Not for the first time it must be protested loudly that this fascination with reasoning is excessive. It is excessive because much of our thinking consists of exploratory problem solving that is not constrained by rules, and is not argumentative. Faced with a problem, we generate guesses in a more or less blind manner, hoping that one may offer some kind of solution; then use reasoning or calculation, again more or less blindly, to find out whether or not our guesses are any good. Real critical thinking ought to be the exposure not of poor arguments but of poor guesses.
- 5 This is as true in mathematics as it is in physics. Deduction is not a characteristically mathematical method, even if mathematical proofs are deductive. It is the subject matter of mathematics. Can  $Y$  be proved from  $\Gamma$ ? No one who has ever proved a genuine theorem could think that mathematics is largely a matter of coining deductive inferences.
- 6 These considerations hold in logic as much as in psychology (or ‘in theory as much as in practice’). *There is no known way of advancing successfully into the unknown.* We can only try. Although we always know something, we are quite blind to what we know nothing about.
- 7 Once the urge to regard scientific investigation as an argumentative process is conquered, the enchantment of induction and inductive logic should atrophy. The one purpose of argument is to assist criticism, and correction. Invalid arguments cannot do this, hence have no purpose. Interest should evaporate too in whether scientific knowledge is well established, or whether it ‘can justifiably be relied on’. These are the only respects in which Hammersley’s column (d) (his preferred column) in Figure 1 on p.3 would differ from a corrected column (c) (that is to say, a column (c) that reflected accurately what Popper himself claimed for the method of conjectures and refutations).<sup>\*</sup> Hammersley gives no hint of how scientific theories are able to achieve the status that he ascribes to them. Nor does he explain the use of justification (which, he admits, is always inconclusive). In Chapter 3 of my *Critical Rationalism* [1994], I fulminated against the view that arguments have any power to justify. I suggested also that this matters not a bit. It is not important that our hypotheses are justified. What is important is that they should be true.
- 8 It may be ‘a shocking phrase’ (D. Stove, *Popper and After*, 1982, p.14) to justificationists, but the title (‘Conjectural Knowledge’) of Chapter 1 of *Objective Knowledge* shows that Popper had no ‘commitment’ to the view that knowledge is certain. Hammersley (p.6) maintains otherwise. Furthermore, although ‘much of Popper’s [non-inductivist] account of scientific method . . . [is] sound . . . [t]here are contradictions [attributed to Newton Smith and to Stove] between his commitment to logic as the basis . . . for knowledge and other elements of his position’. To me this objection is unclear. But if it is that Popper highlights, in the business of science, the importance not only of logic but of decisions, then I can say only that I see this as one of the strengths of his position, rather than a failing. Logic (or reasoning) decides nothing. It is we who must decide.

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<sup>\*</sup> Added April 2003: Column (d) claims that ‘[t]here is no unique starting point [to scientific method], since inquiry always builds on what went before’. To Popper, in contrast, is attributed only the view that the starting point is not perception. But see *Objective Knowledge*, Chapter 2, §2. Column (d) claims also that ‘[t]he product of science is well-established knowledge which can justifiably be relied on’, and that a central element of scientific method is ‘inference from what is observed’. Doctrines contrary to these are attributed, quite correctly, to Popper.