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Chapter Nine

ALL HAIL THE GREAT ABSTRACTION: *STAR WARS AND THE POLITICS OF COGNITIVE PSYCHOLOGY*

[pp. 127-140]

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> Form rhizomes and not roots, never plant! Don't sow, forage! Be neither a One nor a Many, but multiplicities! Form a line, never a point! Speed transforms the point into a line. Be fast, even while standing still! Line of chance, line of hips, line of flight. Don't arouse the General in yourself! Make maps, not photographs or drawings. Be the Pink Panther, and let your loves be like the wasp and the orchid, the cat and the baboon.
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> (*Deleuze and Guattari 1981*)

What is it for an experiment, a theory, a framework, a research program, or an explanation to be cognitive? In cognitive social psychology or cognitive psychology, what does the appending of *cognitive* add to just plain old social psychology or psychology? Sometimes it seems that cognitive is a mere honorific, meaning something like 'what we think is good or what we do here'. Other times, it seems that we are being presented with a new field for study and, other times still, that we have in the cognitive a complete approach or perspective on the whole of psychology.

White (1985) examined the reference lists of seven introductory textbooks in cognitive psychology published in 1979 and 1980. Taken together the texts cited over 3,200 references. However, of these, only 19 appeared in all seven books and only 144 publications were cited in four or more of the texts. As many as 2,620 appeared in just a single book. White takes this as evidence that there is not good agreement amongst cognitive psychologists as to just what constitutes their field and what are its basic findings.

However, being able to point out widely agreed upon 'classic', 'essential', or 'paradigmatic' (Kuhn 1962) sources is only one way [128] iin which a coherent discipline can become established (can become disciplined). Elsewhere (Bowers, forthcoming), I suggest that cognitive psychology secures its legitimacy through a set of presupposed myths and fictions. When I say myths and fictions, I do not mean that cognitivism rests on illusion, rather it has a grounding or *a priori* which is *narrated,* a set of stories or *dramas* which teachers tell pupils and researchers recount amongst themselves when the long cold nights of scepticism, self-doubt and budget cuts draw in. These dramas need not involve citations of critical experiments, indeed that might militate against their story telling function. What is important is that they are seductive in that sceptics can be drawn in, become fascinated, and come out believing that going cognitive is the right way to proceed.

These dramas are real enough. They have consequences for the way the psychology called cognitive gets done, for what might be called the texture of its theory, for the kinds of affinities and alliances cognitivism and its practitioners form or suffer: that is, for both its theory and its (political) practice. As a result of one such drama, I shall try to show that cognitive theories have a vocabulary which has affinities with militarism and which has made possible the co-option of both its metaphors and some of its advocates for work on the Strategic Defense Initiative ('Star Wars'). This slide from science to politics you might find alarming but cognitivism has always had a political existence since its formative moments in Cold War America and post-Second World War Britain (see the discussion of Broadbent's aviation work in Best 1986). Indeed, I would want to extend Jameson's (1981) thesis and claim that scientific theories, frameworks and the rest - like all texts - have a *political unconscious,* a set of political concerns - often unarticulated but which come to light at critical times and which determine what passes as neutral, disinterested, value-free science.

THE TURING TEST *OR* PRECONDITIONS ON MINDS BECOMING MACHINES

It is widely claimed that what is distinctive in the cognitive approach resides in the assumption that people are processors of information. For example, in an influential social psychological textbook, Eiser (1980: 8) explicitly says as much. In an introduction to cognitive psychology, Best (1986) devotes several [129] early pages examining what this might mean (pp. 23-9). In an extensive review article in the *Handbook of Social Cognition* series, Brewer and Nakamura (1984) document the importance of information processing psychology and particularly note Neisser's (1967) book, *Cognitive Psychology,* and its championing of computer programming and data processing analogies.

These are just a few examples of a widely disseminated claim: people can be regarded as information processing devices in some way akin to computers. Now, the question I want to ask is how the computational metaphor has become established, how it has secured legitimacy, what persuasive stories have been told about the similarity between minds and machines? After all, the computer I am using now to write this is mains powered, has a hard plastic case, a screen, a keyboard and a 'mouse-button' attached. As an information processing device, it looks in many ways quite different from me and has quite different physical properties. What stories have we been told which renders these considerations irrelevant to the appropriation of computational devices as metaphors in cognitive psychology? The Turing Test or Imitation Game is one of these stories.

In 'Computing Machinery and Intelligence', a paper first published in *Mind,* Turing begins: 'I propose to consider the question "Can machines think?"' (1950:53). However, rather than consider the question directly, which he believes would force him to provide definitions for 'machine' and 'think', he substitutes the following scenario:

> The new form of the problem can be described in terms of a game which we can call the 'imitation game'. It is played with three people, a man (A), and woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman. He knows them by the labels X and Y, and at the end of the game he says either 'X is A and Y is B' or 'X is B and Y is A'. The interrogator is allowed to put questions to A and B thus:
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> C: Will X please tell me the length of his or her hair?

[130]

> Now suppose X actually is A, then A must answer. It is A's object in the game to try to cause C to make the wrong identification. His answer might therefore be:
>
> 'My hair is shingled, and the longest strands are about nine inches long.'
>
> In order that tones of voice may not help the interrogator the answers should be written, or better still, typewritten .... The object of the game for the third player (B) is to help the interrogator. The best strategy for her is probably to give truthful answers. She can add such things as 'I am the woman, don't listen to him!' to her remarks, but it will avail nothing as the man can make similar remarks.
>
> We now ask the question, 'What will happen when a machine takes the place of A in this game?' Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman? These questions replace our original, 'Can machines think?'
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> *(Turing 1950:53-4)*

Further on, Turing declares his faith:

> I believe that in about fifty years' time it will be possible to program computers, with a storage capacity of 10~, to make them play the imitation game so well that an average interrogator will not have more than 70 per cent chance of making the right identification after five minutes of questioning. The original question, 'Can machines think?' I believe to be too meaningless to deserve discussion. Nevertheless I believe that at the end of the century the use of words and general educated opinion will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted.
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> *(Turing 1950:57)*

The Turing Test as a dividing practice

The dramatic scenario Turing describes has a number of features which are worth bringing out. We can associate with the game what [131] can be called two regimes: one of vision and one of articulation. The Test contains particular constraints of visibility. The man/machine and the woman (A and B) are removed from the interrogator (C). The interrogator stays in a separate room. In this way, it is ensured that the interrogator cannot use the act of inspection to settle the issue of who is the man/machine and who the woman. The separation of the participants into different rooms constitutes the Test's regime of vision. It sets up a boundary between the interrogator and the others. It divides and differentiates the participants.

The Test also contains particular constraints on what can be articulated. The interrogator articulates a certain sort of speech (questions) to which the man/machine and the woman are constrained to respond (with intelligible answers; Turing does not allow in his depiction of the game that they might respond with concerted disruption of the game itself). The man/machine and the woman are further constrained in terms of the medium of their answers: it is 'better' that they use a typewriter so that the physical qualities of their voices will not give the game away *(sic)*. In this way, associated with the Test's constraints of visibility and complementing them, there is a regime of articulation which ensures that some forms of communication are privileged over others which are excluded.

The emphasis I have just given to regimes of visibility and articulation owes much to Foucault's work and particularly to Deleuze's (1988) interpretation of it. Foucault - in a number of studies (e.g. Foucault 1975, 1977, 1980) - has shown that forms of knowledge have associated with them forms of power-relations (see Sampson, Chapter 8, in this volume). Indeed, to insist on this, Foucault often couples power and knowledge together and speaks of power/knowledge *(pouvoir/savoir).* This insistence has a number of effects but an important one is that talking of power/ knowledge should make us sceptical of claims that knowledge can exist in some pure, disinterested realm, abstracted away from particular social applications and the political questions this raises. I take Foucault as showing that claims to know are always political. Similar comments can be passed on the Turing Test. Even though here we are talking about the seductiveness of a dramatic scenario rather than a set of actual institutional arrangements, a *narrative* and not an *institutional a priori,* we must note how the two [132] flow together. Boundaries are defined, constraints placed upon orders of visibility and articulation, boundaries and constraints which make possible certain forms of knowledge. The boundary between interrogator on the one hand and machine and person on the other makes possible treating the latter two as similar. Without the veil of ignorance that the boundary constitutes, we would only have to *look.* Communication is restricted both in ways which ensure that the quality of a voice cannot enter into consideration, but also so that the interrogator's decisions are made non-negotiable. The game is so constructed that the interrogator decides on the identity of the participants autonomously.

Although the Turing Test is a kind of thought experiment, its imagined implementation makes possible forms of knowledge with particular properties. Accepting the fascination of the Test is productive of knowledge that is non- or anti-materialist (inspection of the stuff of which the participants are made is ruled out), knowledge that reduces language to a question and answer probing, knowledge that arises without negotiation and/or disputation between the knower and the object of knowledge. All this is built into the very fabric of the Test. These are some of the theoretical prejudices of the knowledge we call cognitivism. If you forget the constructedness of the Test or if you regard it as 'fair in its selection of the features of the world that matter, you have already been initiated into cognitivism.

The Turing Test: abstraction and universal simulation

The Turing Test is contrived so as to force a differentiation between those features of the world that matter to the question of the similarity of thinking beings to machines and those that don't. Sets of typewritten outputs matter, the nature of the embodiment of the beings and machines under test does not. Now, the point I want to make is that carving up the world in this way makes possible treating two things which are otherwise different as the same. As long as two things (e.g. a mind and a machine) are similar with respect to the *things-that-matter,* we can treat them as being the same with respect to some newly fashioned abstract category which they are both members of: e.g. the category of intelligent artefacts (see Simon 1981). Or to put the point another way, creating [133] abstract categories heightens our ability to say that two things are the same; abstraction is the process whereby the different gets reduced to the same. Once two things are made the same in abstraction they become exchangeable as equivalents, one can substitute for the other.

Indeed, Turing's work can be seen as marking a new phase in the historical development of abstraction. Consider De Landa's (undated) account:

> With the development of the Nazi encoding machine, the Enigma, the mechanisation of cryptology achieved an all-time high. Breaking this code required the work of some of England's most brilliant mathematicians: it also involved the incarnation of the first Turing Machine.
>
> Named after its inventor, this machine came into being as an abstract mathematical entity designed to solve extremely abstract problems in metamathematics. In particular, the increasing mechanisation of number theory, brought about by the creation of powerful formal calculi, created the need to answer certain questions about formal systems in general. These questions came to be known as Hilbert's program.
>
> Working on these problems, Turing abstracted the functions of real machines and figured out a way to define them in purely formal terms. To break the Enigma code, this machine had to be brought from its abstract existence into reality. The story of the birth of the computer is the story of how, under wartime pressure, what used to be relations between concepts became embodied in physical relations between switches and other electromechanical devices.
>
> And this is especially remarkable since Turing's was not an ordinary machine. As opposed to the Enigma machine which did only one thing - it scrambled information in complex ways - the machine designed to defeat it had to be that much more versatile. *In fact, the central idea behind the Turing machine was that it should* be *capable of simulating* every *other machine*
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> *(De Landa n.d.: 179-80, my italics)*

De Landa's point is two-fold. First and in general, we must understand formal, abstract systems as lying within a *circuit* of [134] abstraction and concretisation. Some metamathematical problems are given a solution through the postulation of a highly abstract machine which can stand for the functions of real, concrete machines. However, this abstraction is complemented by a concretising manoeuvre in which actual machines come into existence to break the Enigma code. Second, Turing accomplished this not by merely reconstructing the Enigma machine and - as it were - running it in reverse to decode encrypted messages. Rather, he abstracted a universal simulation device which could stand for, not just Enigma, but all other machines. In Turing then, we find the abstractive tendency, the desire to reduce the different to the same, developed to its highest form. But his very abstraction makes possible a multiplicity of (re)concretisations, equivalences and substitutions: computers as surveillance devices, as production-line automatons, as minds. De Landa's argument is consistent with our earlier reference to Foucault: along with abstract knowledge and theory, there come concrete social practices. Just as it is mistaken to think knowledge apart from power, so must we not ignore the interplay of abstraction and concretisation. To theorise abstractly is not to remove oneself from the affairs of the daily world. On the contrary, a universal simulation device can enter into indefinitely more circuits of abstraction/concretisation than can a device which substitutes only one other. As we shall see, forty years on, the Turingesque abstraction of cognitive theory has made possible new links with war, with Star Wars.

STAR WARS

The Strategic Defense Initiative (SDI or ‘Star Wars’) was announced by President Reagan in a speech to the American nation on 23 March 1983. In this speech Reagan outlined a research program culminating in the development of an impermeable shield to protect the United States against any incoming ballistic missile. Although much of the debate around Star Wars has focused on its technical feasibility, it is important to note the program’s ideological effects. Star Wars promotes an image of work done under its auspices as defence and not aggression, and introduces the image of a fully automated war in which few soldiers need be involved. For example, in a debate in [135] the quarterly newsletter of the UK based *Society for the Study of Artificial Intelligence and Simulation of Behaviour;* Wilks (1985: 24) suggested that ‘military-oriented AI work’ is less concerned with ‘weapons of mass destruction’ than ‘with automated battlefields, robot vehicles, image identification, pilot modelling, etc. Many of these would have the function of keeping one’s own people out of harm’s way. If one is going to have wars at all, a strong moral [= chauvinistic?] case can be made for doing that.’ Especially in the post-Vietnam American context, this last point has a considerable significance for the program’s supporters. As Mosco (1987: 12) puts it:

> Ronald Reagan’s Star Wars proposal may seem to us merely an expensive, if dangerous, piece of science fiction. Yet it strikes deep resonances with many aspects of our lives: the reshaping of our work; the manipulation of our yearning for security; even our nightmares, as well as the science fiction that we read. In the sense that it affects our behaviour and fears, it is already working.

The sense of the ‘workability’ of Star Wars that Mosco in tends is at least as important as the one which underlies many of the technical debates (e.g. Parnas 1985; and see discussions in Bulkeley and Spinardi 1986, chap. 8; Thompson and Thompson 1985). Even if SDI fails in some technical sense, the existence of the program can yield success in a manifold of other ways. In particular, it contributes to the *militarisation of science,* a process with which cognitive science has particular affinities.

Artificial intelligence, cognitive science, and the Strategic Defense Initiative

It is important to realise the sheer extent of potential overlap between the research programs associated with Star Wars (especially the so-called Strategic Computing Initiative) and the concerns of cognitive psychology, artificial intelligence, etc. For example, the intense source of infra-red radiation from missiles during ‘boost phase’ when they ascend after launch is easily detectable, but currently existing surveillance sensors do not permit the ready discrimination of one source from another nor the tracking necessary for planned interception. Clearly, this raises [136] issues of object perception and constancy of the sort discussed in any textbook on visual cognition (e.g. Bruce and Green 1985) and of prime importance to computational studies of vision since Marr (1975). In 1985, 32 per cent of the SDI budget was accounted for by SATKA - Surveillance, Acquisition, Tracking and Kill Assessment - (Bulkeley and Spinardi 1986:103); and many of the major companies with private Star Wars contracts have a stake in artificial intelligence projects of this sort (e.g. Boeing, Martin Marietta, Texas Instruments and Bell Helicopter, see Mosco 1987: 18-19). Additionally, according to many proponents, visual cognition is one of the more successful applications of parallel distributed processing (PDP) modelling techniques. Though not directly through the SDI organisation, most of the US research on PDP has been supported by defence funds.

Particularly instructive (but easy to miss) are the affinities that concepts in cognitive science have with the proposed system architectures for battle management suggested to the SDI Organization by the Eastport Study Group. This group's report (Eastport Study Group 1985) contains recommendations for the structure of the computer software and hardware which would control defence against a Soviet strike. Consider the following:

> The most plausible organizations for a strategic defense battle management system are hierarchic. That is, their communication and information-processing structure can be portrayed graphically in 'tree' diagrams such as an organization chart or depiction of a chain of command. This hierarchy or tree structure of a battle management system is rooted in the command authority and branches to the sensor weapon subsystems. The properties of such hierarchic systems are very well understood both analytically and by analogy to this same organization having been adopted by living creatures and their social organizations.
>
> Such systems have the property that information sensed at the 'leaves' of the tree is processed (compressed) into more abstract representations as it is communicated toward the root, and is articulated from abstract representations to detail commands as it is communicated toward the leaves. This communication and computation structure preserves locality and allows for autonomous actions from local [137] subunits, which have the same tree-like structure as the entire system.
>
> *(Eastport Study Group 1985: 7)*

This passage has a number of important features which I shall discuss in the sections below.

Hierarchy

The emphasis on hierarchy is very familiar from many models and theoretical constructs in cognitive psychology. A selection of examples: Craik's early and influential models of action control (for a discussion, see Johnson-Laird 1985); artificial intelligence work on planning (Doran, 1984, goes as far as to say that all 'effective' planning models are hierarchical); recent cognitive psychological work on mental maps has involved suggestions that internal representations of space are hierarchical (e.g. McNamara 1986); Taylor and Crocker's (1981) account of social schemata, like Rumelhart and Ortony's (1977) cognitive theory, emphasises the hierarchical embeddedness of schemata and subschemata; hierarchical structures are emphasised for natural categories by Rosch (e.g. 1978) and for self-categorisations by Turner and Oakes (1986); Harré, Clarke, and DeCarlo's (1985) book is full of suggestions for hierarchical control systems.

It would not be hard to generate fragments of plausible cognitive-psychology-talk by substituting *central executive processor* (in the sense of Atkinson and Shiffrin 1968) for *command authority;* and *perceptual modules* (in the sense of Fodor 1985 and those who have followed him) for *sensor weapon subsystems,* etc. Conversely, a military reader of cognitive theory can derive plausible SDI-speak by substituting in the reverse direction. As I argued above, these substitutions and affinities are made possible by the abstraction and universal simulation elements of the Turing Drama.

Technological structure and social relations

In the case of the Eastport Study Group's work, it is important to note that the hierarchical structure for the software architecture is repeatedly legitimated by reference to hierarchical (particularly military) social systems. A number of writers in the sociology of [138] knowledge have tried to draw parallels between social structure and the structure of knowledge-claims and technology. This work often omits to suggest any mechanism to generate the parallelism and typically fails to show that the alleged parallelism or 'homology' is anything other than an analyst's version foisted on the material under study. However, in the passage above, it is clear that this parallel is significant for the authors of the text, not merely for us analysing it.

Indeed, it is crucial that the battle management architecture should have some points of similarity and contact with military command relations because the Study Group envisage the system as interacting with the 'command authority':

> A condensed picture of [each] local situation would be reported for purposes of threat assessment to higher authorities in the hierarchy. The higher-level battle management combines the threat assessment information from many such battle groups ... to present a condensed threat assessment to the command authority... there must not be a loss of human control over the independent groups [of defensive weapons] ... For example, the command authority could authorize only some of the independent groups to be armed in order to match the defensive level to the type of attack.
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> (*Eastport Study Group 1985: 24, 26*)

At the lowest levels, a multiplicity of events occur by the millisecond but at the highest level, condensed information is presented to the command authority, updated 'every second or so' (ibid.: 24). Thus, the Study Group see a hierarchical battle management system interacting with the command authority - a group of human 'end users' (ibid.: 6). This is not a fully automated war. Rather, it is a war with mechanisation at lower levels of command, where humans are substituted, their command and communicative relations being maintained in the software alongside a maintenance of human involvement at the highest levels. If, as Wilks hopes, the Al, computing and cognitive science contributions to the military 'have the function of keeping one's own people out of harm's way', it is at the cost of the responsibilities of warmongering falling to ever smaller and less accountable groups of experts and generals.
[139]

Abstraction, cognitivism, and militarism

If, as I suggested above, the abstractionism and role of simulation in the Turing Test make possible effortless translations from cognitivism to militarism, this is a rather cruel irony for some of the more politicised champions of cognitive theory. For example, Shallice (1984: 33) claims that "'general intelligence,, as a concept has ideological force, because if one strips it of its technical complexities, it corresponds closely to a lay concept. Concepts like "primary memory", "logogen" and "ATN" do not. Moreover, information-processing concepts offer far less scope than, say, sociobiological ones for loose extrapolations to socially sensitive areas.' On the whole, Shallice seems to endorse the view that cognitivism is a politically progressive advance over behaviourism and that the 'social control functions of a future psychology' lie principally in cognitivism being employed not as an 'ideological justification' but as a 'technical component' (i.e. cognitive theory is used instrumentally as a means to an undesirable end). Similarly, in the first issue of *Cognition,* Chomsky (1 972), after a lengthy criticism of Skinner's (1971) *Beyond Freedom and Dignity* and Herrnstein's (1971) work on the social consequences of the inheritance of IQ, urges scientists to be aware of the ways in which their investigations are likely to be used. While thinking it unwise to prevent scientists from engaging in 'fundamental issues' of controversy, Chomsky acknowledges that researchers may often face a difficult 'conflict of values'. 'Of course, scientific curiosity should be encouraged (though fallacious argument and the investigation of silly questions should not), but it is not an absolute value' (Chomsky 1972: 42).

However, positions such as these, which emphasise the moral/political dilemmas surrounding the consequences of a theory or body of work, leave out of account what makes the theory possible in the first place, what political or institutional arrangements may be pre-supposed in the work. It is for this reason that we have emphasised the *narrative a priori* of the Turing Test, what is pre-supposed in the Test and might be tacitly agreed if the Test is found to be persuasive. We argued that the Test makes possible non-negotiable, 'third-party' (see Shotter 1987) forms of anti-materialist knowledge which mark a new phase in abstraction, permitting machines and people to be exchanged as equivalents. [140]

These features derive from the regimes of vision and articulation which make up the Test and which cannot be separated from it. To be sure, abstractionism allows concepts removed from 'lay consciousness' (Shallice 1984) to come into existence but abstraction expands the number of concretisations which can be made, not diminishes it. Whereas 'general intelligence' could only be connected up to various crude educational programs, 'hierarchical control models' can be concretised anywhere (though perhaps over northern hemisphere theatres of war first!).

Latour (1987) suggests that we should look at 'science in action' not merely 'ready-made science . To understand science, we have to pursue scientists in their disputes, their attempts to win over allies and keep them in line, their struggles against all manner of adversities. We should not concern ourselves only with the I near-inscrutable 'black boxes' that ready-made, established science presents us with. If we follow science in action, Latour argues that we come to see science as an activity involving the construction, strengthening and extension of networks of associations. Cognitive theory has proven itself to be a particularly effective resource for the creation of long networks. In this chapter, we have seen cognitivism connect Second World War metamathematics, aviation research, social psychology, Star Wars, and a cast of thousands. Cognitivism's abstractions makes this possible.

As Latour (1987:172) notes, it is not a strange coincidence that any body of work able to muster long networks eventually comes across the military. 'For centuries, they have enlisted people and interested them in their action, so much so that most of us are ready to obey them blindly and give up our lives if required. As far as enrolling, disciplining, drilling and keeping in line are concerned, they have proved their mettle and on a much larger scale than scientists have ever tried.... The similarity between the proof race and the arms race is not a metaphor, it is literally the mutual problem of *winning.'* Cognitivism, like all technoscience, is part of the late twentieth century's war machine and should be studied as such. [End of page 140]