

Education policy, research and neuroscience: The final solution?

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Abstract

Taken as a whole, the findings of educational research are often inconclusive; far too many competing ideas and thus difficult for policy makers to decide what to believe, unless it happens to be saying what they really want to hear. An alternative approach is not to seek help from education research, but rather from the much more 'scientifically reliable' findings of neuroscience. Perhaps, after all, this will provide a final solution, uniting education, policy and research. For example, it turns out that our ability to empathise, to think ourselves into another person's situation and be considerate of their feelings, is a function of the brain. Some of us have that ability, because our brains are so constructed that they allow us to empathise, and some do not. Those who do not are likely to end up committing horrific crimes. This means that it should be possible to scan the brains of children to see whether they are likely to become vicious criminals and so isolate them, before they commit crimes. Perhaps this is the final solution to the problem of children's anti-social behaviour? Philosophers of education need to make informed responses to the evidence of neuroscience and its policy implications for education, and their responses need to be on-target. This paper presents some of the relevant neuroscientific evidence regarding empathy, truth and free-will, and engages in some preliminary target practice.

Education theory and education policy – the backdrop

On my desk there's a small booklet with a green paper-back cover bearing the title *Teachers Mistaught*. It was published in 1990, in the UK, by the Centre for Policy Studies. Its author is Shelia Lawlor. It is hard to imagine that this small book caused such immense anguish within British education faculties, and such curiosity overseas - especially in Australasia and the US. Yet it did, and for two main reasons; first, the Centre for Policy Studies was the think-tank of the then 'New Right' and it strongly influenced the Thatcher government's policy-making and, second, it proposed closing down all university faculties of education. As the title suggests, its immediate focus of attack was teacher education, but Lawlor and her associates had little respect for education as an academic study; believing it to be a hot-bed of leftist theory that bedevils the whole educational enterprise. With regard to teacher education, Lawlor claimed that:

Instead of putting the mastery of the subject at the heart of the course, as the essential foundation for good teaching, the training courses demeans the subject to being little more than a peg on which to hang modish educational theory (ibid., p.42).

The solution to this problem, she argued, is:

... that both PGCE and B.Ed. courses be abolished - and with them the university departments of education. Instead, graduates will, as happens in other professions, train on the job and be paid a salary from the outset (ibid.).

And those currently employed in faculties of education in universities should be:

... offered the choice of going into school-teaching at a senior level; of taking early retirement; or, if they are distinguished academically, of moving to the department of a university where their subject (English, maths, physics etc.) is studied (ibid., p.38).

Lawlor's claims about the distorting influence of theory in teacher education were supported by reference to the prospectuses of a number of teacher education institutions, including London University, Institute of Education (IOE). That has personal significance, because in 1989 I had been appointed to direct a major course and staff development project at the IOE, having previously been a member of the lecturing staff. By 1990, when the Lawlor publication surfaced, we were in the process of putting together the London Area-based Scheme, a pioneering school-based teacher education course. Though we briefly deliberated whether to continue we kept going, believing, with colleagues at Oxford, in the school-based approach. That was timely. Margaret Thatcher ceased to be Prime Minister and the subsequent government, under John Major, made the school-based approach compulsory. We suddenly found ourselves in the lead.

There are two main conclusions I want to draw from the account just given. First, governments are in no way bound to trust education theorists on any matters to do with education policy and practice. They and their political allies may be deeply suspicious of education theory and look elsewhere for advice. Second, it is always wise to be one step ahead of the game, if possible. I take it that both conclusions are non-trivial. Taking these two as a backdrop, my main strategy in this paper is not to produce a commentary on philosophical texts, but rather to comment on certain findings within neuroscience. Perhaps, by analogy, one might consider the theoretical construct of neuroscience to be a text, though in that case it would be more accurate to use the plural, as neuroscience comprises many sub-disciplines. There are, I suggest, good reasons to believe that neuroscience will increasingly bear on education and will be perceived as having practical utility by policy makers. Those in education, including philosophers of education, need to be one step ahead. The key question I wish to open up in the first half of the paper is 'why do school students frequently misbehave and what can be done about it'? Is the source of misbehaviour primarily social and environmental, or is it to be found in the biology of the brain? The second half will begin by considering the philosophical tools required when contributing to the neuroscientific debate, before addressing issues of empathy, truth and freewill.

The problem of student behaviour

Whenever I've asked student teachers about their worries when going into school to practice, they've consistently identified two main concerns - subject knowledge and classroom discipline. Lawlor was right about the importance of subject knowledge. Worries about children's behaviour in the classroom, on the other hand, not only afflict newly qualified teachers; they remain a major cause of concern and mental stress throughout many a teacher's career. Arguably, this is the biggest issue that teacher education courses the world over have consistently failed to resolve. Yet, problems of classroom management, as they are often rather evasively called, have produced a veritable industry over the years. We have had behaviourist conditioning theories and strategies, assertiveness techniques, reality therapies, and the child-centred

approaches, to name just a few. But, however convincing these psychological theories may appear in theory, my impression, from my own school teaching experience and from observing student and newly qualified teachers over the years, is that they are of limited practical use in dealing with misbehaving children. And if they do not deliver, they are not going to appeal to policy makers concerned to make good on election promises regarding juvenile crime and its links to disruptive school behaviour, especially if a better, more reliable alternative is at hand.

Arguably, one of the problems of the psychological approaches mentioned above is that, despite their very real differences, they all assume that it is the environmental background that mainly underscores children's behaviour, not their brains. So, for example, within child-centred psychology, Karl Rogers was at pains to emphasise that children are born prior to good and evil; nurturing and upbringing are the decisive factors that account for differences. At the other end of the spectrum, behaviourists placed their emphasis on environmental conditioning techniques of one kind and another. They, in particular, believed that psychology had no need to consider the brain or the intervening mental processes within the brain that underlie perception, attention, memorising, planning, thinking and action. Perhaps, however, we do need to consider the biology of the brain; perhaps that is where one should look to find the source of behaviour, though remembering, of course, that the biological processes of the brain are constantly responding to environmental experience. Not surprisingly, many people working within the neurosciences stress the biological factors. Maybe, for anxious policy makers, the evidence of neuroscience *is* the better alternative, now at hand?

Consider, for example, issues of empathy, truth-telling and freewill. These are clearly of the greatest importance in regard to student behaviour. The ability to think oneself into another person's situation and be considerate of their feelings would appear to be essential in regulating the extent of one's behaviour. And we generally assume, on *prima facie* evidence, that all human beings possess the ability to empathise, though we may not all exercise it consistently or to the same extent. Similarly, we believe, at least in principle, given a normally functioning brain, that it is possible to give a factually truthful account, based on an accurate recall of events. In other words, one could not sincerely and honestly recall events that did not occur. And though we all realise that we are often constrained in what we do, we nevertheless believe that the actions of both adults and children are under the control of the conscious mind, allowing us to choose what we do and when we do it.

The point is that each of the claims just made in regard to empathy truth and freewill are denied on the basis of recent neuroscientific evidence, though admittedly some of the original research predates that evidence. In short, *not everyone* is able to experience and exercise empathy; we *can* honestly recall events that did not occur, and; the conscious brain is *not* in total control of behaviour. Moreover, there is a body of opinion within the neurosciences that anticipates it may not be long before it is possible to scan the brains of young children to identify those most likely to end up committing serious violent crime, such as rape and murder. It is then but a short step for neuroscientists such as Professor Gerhard Roth at Bremen University to say that such people should be isolated from society *before* they commit a dreadful crime, as one would isolate someone with a highly infectious, deadly disease.¹ The potential benefits of screening children will not be lost on governments and policy makers, especially when it comes with all the credibility that

accompanies the evidence of 'real science'. Not only might it provide a lasting solution to the most serious problems of misbehaviour in schools, it could also begin to eliminate the problem of juvenile crime and, in the long term perhaps, all violent crime as potential offenders are identified in advance of their committing a crime. On March 27th this year (2007), in the UK, the then Prime Minister Tony Blair announced that all children could be required to take tests to find out whether they are at risk of becoming criminals. The Government plans to:

...establish universal checks throughout a child's development to help service providers to identify those most at risk of offending.... These checks should piggyback on existing contact points such as the transition to secondary schools (Topping, 2007).

Though the UK Government did not specify what form the 'universal checks' will take, one can assume they will include fMRI screening, where the brains of children will be monitored while they view selected images. The reaction to this announcement by the National Association of Head Teachers (NAHT) in the UK was as predictable as it was off-target. General Secretary Nick Brooke was reported ² as saying that he does not know what purpose this will serve and it is very difficult to see what schools can do without simply labelling children as potential criminals. Assuming he was reported correctly, does he really believe it will serve no purpose to identify those children most at risk? Will it not serve a major purpose for government? And, could it not be an act of deep compassion, providing the first step on the road to recovery for those children who are identified? Screening does not necessarily lead to children being criminalised. We have all become used to security and health screening at airports without feeling we are being criminalised. It is not the screening, as such, that gives rise to a feeling of being criminalised, but how one is treated after being identified as having a problem. Though I have little interest in what the NAHT says, I am concerned what philosophers, particularly philosophers of education, might say about these complex issues.

The role of philosophy within the neurosciences

Though there are a number of very able philosophers already contributing to debate within the neurosciences, in education we need more. There is also a very real need for students of education to think deeply about the relevant philosophical issues ³, as the influence of the neurosciences on education increases; so there is a need for courses particularly at the MEd level. In making our contribution, we can bring all the normal tools of philosophical argumentation and critical analysis, but we also need two additional tools. First, though the neuroscientific literature is too vast to cover in detail, we do require an accurate understanding of key themes being discussed, including some acquaintance with the primary texts of neuroscience; not simply secondary texts in which philosophers discuss the primary texts. Within education, empathy, truth (related to memory) and freewill (as related to morality) are key themes, as I hope to show shortly.

Second, we need a historical perspective, in order to contextualise our understanding of neuroscience. And, as many working in neuroscience come from a background in psychology, we need to be cognisant of previous psychological baggage they may be bringing to the debate. Some of which is productive, some not. The idea that philosophers need a grasp of history is not at all new in the philosophy of science, at

least in its post-positivist development since the first half of the twentieth century. The connection is very clear, for example, in the work of Thomas Kuhn. If one wants to fully understand *The Structure of Scientific Revolutions* (1970), one would do well to study his earlier work, *The Copernican Revolution* (1957), arguably the best historical treatment of that period of science, where one will find in embryonic form the better known concepts of *The Structure*. In mainstream philosophy, however, there is a tendency to discuss ideas with no regard for their historical context. When reading the philosophy of mind, one sometimes wonders whether Descartes is still thought to be alive. By contrast, I wonder whether Descartes would be a Cartesian if he were alive today. Actually, I very much doubt it.

My overriding hope, partly coming from my experience of raising these issues in the past, is that philosophers will not be prevented from taking the neurobiological evidence seriously, because of the current emphasis within philosophy on language and the social embeddedness of our being and discourse. Not everything is reducible to environmental and social influence; we are neuro-social beings, the brain constitutes who we are and what we do. With that in mind, let us look at the evidence and the claims being made in regard to empathy, truth and freewill.

Experiencing empathy

In setting out the case for *The Biological Basis of Crime*, Adrian Raine (2002) notes that, up to the time of his writing, criminologists and sociologists have largely ignored the evidence coming from neuroscience. He speculates that this may in part 'be due to deep-seated historical and moral suspicions of a biological approach to crime' (Ibid., p.43). He does not mention philosophers, but I sense that many share those same suspicions. Raine, formerly a British Home Office forensic psychiatrist, but now a professor at the University of Southern California, has been at the forefront of research using brain imaging that claims to show that the brains of criminals are physically different from non-criminals. For example, in one such study conducted in 2000, with a sample of twenty-one males identified as having Antisocial Personality Disorder, a normal Control Group of thirty-four males and a further control sample of twenty-seven males with Substance Dependence, it was found that:

Antisocials had significantly lower prefrontal grey volumes than both Controls and Substance Dependents. In contrast, groups did not differ on white prefrontal volume, indicating specificity of the deficit to grey matter (neurons) (Raine, 2002, p.60).

Similar deficits in the prefrontal lobes (behind the forehead) of violent criminals have now been confirmed in brain scans many times over. What makes this finding particularly significant is that the prefrontal lobes are that part of the brain mainly implicated in the exercise of empathy and what Damasio (1994) calls secondary emotion essential to the exercise of a balanced rationality. The conclusion seems to be that this deficit leads to a weakened functioning of the prefrontal lobes where, at worst, the person has no sense of empathy, because their brains cannot process it. They are severely handicapped, as they cannot mentally simulate feelings, even feelings of what it will be like if they are punished. This handicap may work itself out in different ways. In experimental situations, for example, where subjects are shown horrific images,

many murderers and rapists show minimal or no response compared with considerable activity in the prefrontal lobes of 'normal' subjects. In every day life, those with this deficit will be strongly inclined to seek stronger stimuli, often through violent activity or placing themselves at risk, because their brains do not respond to ordinary events.

Further studies of those classified as psychopaths have revealed that additional areas of the brain are implicated when it comes to fear of being caught after committing crimes. In 2004, Raine examined the brains of what he called 'successful psychopaths', those who had committed crimes but not been caught and 'unsuccessful psychopaths' that had been caught⁴. Both groups shared common deficits that caused them to lack empathy and thus show little or no consideration for others. However, there were marked differences between the two groups in regard to hippocampal impairments, located in the temporal lobes (side of the head). Raine and his team found that while less than half of the successful psychopaths and the control group had an asymmetrical hippocampus, in ninety-four percent of the unsuccessful psychopath the right side was larger than the left. The importance of this is seen in the role the hippocampus plays in laying down memories in the brain. The normal hippocampus, it is claimed, allows the successful psychopaths the ability to learn to fear getting caught, which aids them in the strategies they employ to avoid capture. In addition to the prefrontal lobes and the hippocampus, other areas where impairments in violent criminals have been located include the corpus callosum (where the two halves of the brain join) and the left angular gyrus, which is located at the junction between the temporal (side of head) parietal (top rear of head) and occipital (rear of head) lobes.

What are we to make of all this? Well, first let me say that this research is something of a thriving industry, so at best I have only begun to give a flavour of the claims being made⁵. It is this kind of evidence, particularly with regard to empathy and its emotional correlates, which has led to claims that as soon as the technology is sufficiently improved it *should* be used to isolate those with these kinds of deficits and keep them in secure premises before they commit a crime. As this idea may seem reprehensible, let me ask a question. If it is the case that those who cannot experience empathy are at a very high risk of committing violent crime, and if it is possible through screening to identify them, would it be morally wrong not to do so? Imagine a future scenario in which a fourteen year old boy committed a horrific murder; he had been a constant source of trouble at school, but the head teacher, not wanting to criminalise the boy, had persuaded his parents to resist screening. And the story gets out to the press. Or, imagine a situation where the technology is available but a government refuses to use it on ethical grounds. And then there is a spate of killings. My point is that society and governments will likely back the implementation of screening despite any ethical misgivings they may have, when it becomes reliable. This places a very heavy onus on the neuroscientific community to tell the truth about the status of their findings, despite pressures on them to pursue careers and meet research targets.

As researchers within education, many of the questions we should ask about this research are familiar enough. I have emphasised the vast extent of the research, but how significant are the findings? What in all of this *is* evidence and what is interpretation, or even speculation? What is the counter evidence, and so forth? My own assessment is that in regard to the correlation between deficits in the prefrontal lobes and the lack of empathy and emotion there seems to be very strong evidence, there really are people unable to

empathise, but between that and consequent acts of violent crime the figures are less than convincing. It is not enough to show *statistical* significance; there would need to be a very close correlation before even thinking of incarcerating potential offenders. Ideally, one would want to know that everyone who has the specific deficit to the brain will end up committing violent crime. There is no such evidence. Moreover, as neuroscientist Steven Rose has emphasised many people who are diagnosed as psychopathic do not show brain abnormalities. He therefore believes that the predictive power of a brain scan is currently close to zero. He also points out that even 'if differences in the scans do in fact match differences in behaviour, these are correlations, not causes' (Rose, 2005, p.271).

There is, however, another side to this issue. Though brain scans cannot at the moment be used predicatively with regard to criminality, they can reveal deficits to the brain that accompany the inability to empathise, and thus identify children who appear to be at risk. This is what I think the British Government is latching onto. The justifiable question then arises, what causes such deficits and what might be done about them? Both Raine and Rose agree that though there may be genetic factors at work much of the cause would seem to stem from upbringing, particularly in the early years of development. If that is the case, then maybe something can be done about it. The main policy implication then becomes that children at risk need to be reached, possibly in the first two to three years, not in order to incarcerate and criminalise them, but rather to assist in the development and medical repair of their brains. Raine speculates that:

Two hundred years from now we may have reconceptualised recidivistic criminal behaviour as a clinical disorder with its roots in early social, biological and genetic forces beyond the individual's control (Raine, 2002, p.74).

I am not sure why he thinks it will take that long. I do agree with him when he says that: 'Biology is not destiny, and we can benignly change many of the biological predispositions that shape the violent offender' (ibid, p.43). But, I am also aware that there is a thin dividing line between the use of this research to heal broken minds or, alternatively, to criminalise those identified as not desirable. All in education need to keep a very close watch on the intentions of policy makers. Philosophers, in particular, need to join with those in neuroscience such as Rose in keeping the claims emanating from this research under the closest scrutiny. This is not a fantasy scenario; it is coming sooner than later.

Telling the truth

If experiencing empathy is a problem for some people, telling the truth is a problem for us all. The key to the problem is memory; false memory. Much of the pioneering work on false memory was conducted in the 1970's by Elizabeth Loftus, at the University of Washington in Seattle, and it is ongoing. It is also highly controversial, particularly in America which, historically, has invested so heavily in psychoanalysis and in litigation. The claim that memory is unreliable, and that it is entirely possible to sincerely and honestly recall events that did not occur, is anathema to those engaged in getting their clients to recall repressed memories of childhood sexual abuse, as it is for lawyers seeking watertight convictions based on eye-witness testimony.

Loftus has appeared as an expert witness at more than 200 trials. At the same time, she is a thorn in the

flesh of neo-Freudian movements such as recovered memory therapy. Not surprisingly, she has been subjected to considerable verbal abuse by those opposing her views and their supporters in the US national press. One means of attacking her work has been to claim that her psychological methods do not comply with the supposed rigors of the 'scientific method', a seventeenth-century construct that many in psychology and psychiatry still seem to cling to, even though it is largely discredited. However, this accusation is becoming less telling as her findings are gaining considerable support from neuroscience, in two main ways. First, in what we are learning about the distributed and reconstructive nature of memory, which is very different from the 'memory' of a serial computer, and second from brain imaging studies.

There is no centre in the brain where complete memories are stored, therefore for a memory to occur its component parts have to be gathered from different areas of the brain and brought together in what Damasio describes as a 'trick of timing' (Damasio, 1994, p,95). Every memory is a reconstruction and each reconstruction will, moreover, depend on many factors including mood and situation. What we remember is also dependent on circumstance, as we perceive what we find meaningful in preference to that which we do not. Perhaps, if each neuron in the brain stored one discrete and complete memory, as once believed, it would be much easier to assume that memory can be reliably recalled. However, the distributed and reconstructed nature of memory is much more in keeping with the notion of fallible truth-telling described by Loftus.

Corroborating evidence for the notion of false memory comes from imaging studies in which a subject is shown a film sequence of everyday activities, but the film has a number of gaps where connecting events are missing. The subject is then asked to remember what she saw, while her brain is being scanned by MRI. Which incidents did she actually see and which were left out of the film, the gaps? Consistently, subjects compose a composite of what they actually saw and what they did not see; the brain tends to fill in the gaps. However, what is particularly interesting is that the brain images show that different areas of the brain are activated when the subject is recalling images that were seen and when creating those that were not. The subject however is unaware of creating anything; she thinks she is recalling what she saw.

Again, what should be our response? The notion of an *honest liar* may not be easy to swallow, but are philosophers duty-bound to oppose the conclusions of this research on the grounds of defending the traditional moral and legal notion of telling the truth? Or, should philosophers respond by redefining notions of honesty and truth telling? One may notice, of course, that the traditional concept of truth telling is closely akin to the correspondence theory of truth, which many philosophers of science find less than convincing. In the correspondence theory of truth, a statement is true if it corresponds with the facts. In the traditional notion of telling the truth, a statement is truthful if it corresponds with an honest recall of the facts. This research, at the very least, cautions against the assumption that telling the truth is simply a matter of being honest. In other words, the notion of honesty needs to be redefined, perhaps making it a matter of intent. There is important philosophical work needing to be done here. At a more general level, while much harm has been done to people who have genuinely been abused, a lot of hurt has also been caused to good people when, because of false memory claims, they have been wrongly accused of abusing others. What is tragic is that many of these false memories have been 'recovered' by psychotherapy and counselling, which often presents itself as science ⁶.

Freewill and conscious choice

Earlier in this paper I expressed the hope that philosophers will acknowledge that not everything is reducible to environmental and social factors, and I noted that some philosophers may be suspicious of biological approaches to behaviour, which may prevent a productive dialogue with neuroscience. There is another problem that philosophers might consider when engaging with neuroscience, and that is importing their cherished forms of thought into the debate when they are not appropriate. A rather clear example can be found in a very recent article by Jurgen Habermas (2007), in which he considers whether the neurosciences pose a 'genuine threat to the language game of responsible agency' (p.13). He contrasts this 'language game' with what he calls the 'naturalistic' language game of neuroscience. The use of the metaphor 'language *game*' has certainly had its merits, historically, in allowing religious and moral language back into the fold of rational discourse having been excluded by positivism, but Habermas' use of this metaphor, when addressing the current debate within neuroscience about freewill and determinism, is a distraction. Moreover, it is not likely to appeal to those working in neurobiology, which would not make it inappropriate if the metaphor is crucial to the philosophical argument, but in this case it is not. As John Searle pointed out in his response to the Habermas article:

... he does not seem to realise that the two language games can simply be matters of different levels of description of one and the same system.... There is one level of description of my mental processes where they can be described as neurobiological processes in the brain. There is another level of description of *those very same processes* where they intrinsically have intentionalistic and semantic properties (Searle, 2007. p.71).

The argument in my 2004 PESA paper (Sankey, 2006), was premised on the view that 'each human being is a multileveled psychosomatic unity; a biological organism and a responsible self making choices and having values'. Rather than Habermas' notion of competing language games, this seems to me to be a more appropriate basis on which to engage with biologists on issues of freewill and agency. It is an idea they understand and many accept.

Searle also takes Habermas to task for misrepresenting contemporary neurobiological research, by portraying its view of the brain as a highly mechanistic physical system and contrasting that with our self-conception as conscious, free and rational beings. Searle is certainly correct to say that the notion of consciousness is now widely acknowledged within neuroscience, but there is still a strong tendency to dismiss the notion of freewill and moral agency. This is not simply based on the acceptance of the naturalistic argument that the world is essentially a deterministic system. It is also based on experimentation, many examples being variations on the original work of Benjamin Libet, conducted in the 1960's but now complemented by improved imaging studies. A subject is wired to an EEG that monitors brain wave responses and is then placed in front of clock with just one moving hand rotating at a rate of seconds. The subject watches the hand and is then asked to choose a moment to stop the hand. Perhaps she decides to stop at the point of 45 seconds. That is what she reports, but her brain waves reveal that though she consciously chose to stop the hand at 45 seconds, her brain had already decided to do so in advance. Quite literally, *the brain is faster than you think!* It seems that it is not our conscious mind that makes the decision, but instead the sub-conscious mind. In that case the conscious mind is not in control,

though we think it is. Where, then, does this leave the notion of freewill?

My response to this has been to point out that what this highly repeatable experiment shows is not that there is no control, rather it is not conscious control. In short, I believe that philosophers in particular have placed far too much weight on consciousness as the defining characteristic of personhood (*ibid.*, p.168), which may partly be a legacy of Descartes' mind/body dualism. If, however, we view each human self as a multileveled psychosomatic unity, the notion that we are both conscious and sub-conscious selves is not problematic. Indeed, much of what we do, including all non-declarative memory (Ryle's 'knowing how') is located in the sub-conscious mind, and who believes that our know-how ability is not under control when, for example, we ride a bicycle without thinking about it or 'automatically' drive home when deep in conversation? Incidentally, non-declarative memory is possibly the only memory available to invertebrate animals, as they do not have a hippocampus and other supporting structures required for declarative (knowing that) memory.

At the moment we simply do not know whether the brain is a deterministic system or not. There is certainly some opinion that it may not be (Freeman, 1999). In any event, this is an empirical issue and not a philosophical one, though the status accorded to the empirical findings and their relevance to the issue of freewill are philosophical issues. Our sense that we have freedom to choose may not be illusory. It may simply be that we are not yet in a position to unravel this apparent mystery. For the time being, my approach is to draw on Willard Quine's notion of underdetermination. He applied it to scientific theories, pointing out that all are underdetermined by the facts. My suggestion is that we are all beset by a multitude of determinisms in our lives, yet we remain underdetermined; we do have the ability to make choices, even though these may not all be consciously held in the mind.

Conclusion

Philosophers seem to spend a lot of time arguing over dead-men's clothes, when there may be more pressing issues needing attention. In our rapidly changing world, no area of human understanding is expanding and changing more rapidly than neuroscience. Plato, Descartes, Kant, Nietzsche, Wittgenstein, Foucault, Derrida and now Rorty are all dead and, though they played a pivotal role when alive, their ideas have to be viewed within the context of their time. As Rorty himself acknowledged in regard to what he called edifying philosophers, their 'work loses its point when the period they are reacting against is over' (Rorty, 1979, p.369). For most of them, brain imaging techniques such as fMRI and PET scans were over their horizon, out of sight and mind, yet these technologies are now helping to redefine our understanding of what were traditionally philosophical issues, including the nature of the self (personality, empathy), truth and moral accountability. That should be of interest to present-day philosophers.

Moreover, unless I am greatly mistaken, the claims of neuroscience will increasingly influence education policy, particularly in regard to student behaviour and how it is dealt with, which should be of interest to philosophers of education. Though neuroscience is not the final solution to the policy and research issue in education, its 'scientific' status may well be considered authoritative by policy makers. Its claims, however, need to be held up to constant scrutiny, or there is a very real possibility it may become another

form of final solution; one reminiscent of the Holocaust. I am aware that in this paper I have barely made a start in addressing these issues, though I hope I have gone some way in opening them up for consideration.

Notes

1. A view expressed by Roth on a television programme *The Source of Evil*, broadcast by DW-TV in autumn 2006
2. Reported on the Yahoo.com UK, News webpage of 27th March 2007: *Children 'may face criminal checks'*.
3. In addition to the claims currently being made within the neurosciences regarding the biological basis of crime, issues also include the notion of the self, the nature of human rationality, and the metaphysical and epistemological presuppositions underpinning neuroscience.
4. An interesting distinction! Presumably the researcher's identification of the successful psychopaths was clinical rather than criminal.
5. Raine's own research output is prodigious, but the extent of the literature will become immediately apparent by going to Google and entering the search words 'biological basis of crime'.
6. For a very well presented female perspective on the Recovered Memory Movement, see Paula Tyroler's 1996 paper.

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