

Blinded by Science: The Social Implications of Epigenetics and Neuroscience

David Wastell and Susan White

Policy Press, 2017, HB, 304pp, £21.59,
978-1447322344



PERFECTING PEOPLE

Science is one big story. Or, more accurately, it is lots of stories: conflicting, contested, merging, evolving — and sometimes ossifying, constraining, and distorting. Wittgenstein referred to the 'railway tracks' of science: the unspoken assumptions and shared ways of thinking within a scientific community, without which science cannot progress, and Thomas Kuhn talked of research paradigms: shared and evolving ways of conceptualising, theorising, empirically studying, and arguing about scientific topics.

In their critique of an emerging new paradigm, David Wastell (a cognitive neuroscientist) and Sue White (a social scientist) offer an interdisciplinary text in two parts: 'Getting to grips with the thought styles' (an overview of the shared assumptions, practices, and methodologies on which modern neuroscience is based) and 'Fixing real people' (a critique of contemporary empirical findings and applications of neuroscience, especially in relation to social disadvantage).

In Part 1, the authors explain that neuroscience asks questions like *'Which part of the brain is responsible for which function?'* and *'What happens when that part of the brain is damaged?'* A core assumption, which many neuroscientists share but these authors emphatically do not, is that social disadvantage operates principally by causing organic damage and dysfunction of the central nervous system, especially during vulnerable periods in fetal development, infancy, and early childhood.

Part 1 includes a historical review of technologies used for examining parts of the

brain — from palpation of bumps on the scalp (phrenology) in the 19th century, through electroencephalography in the 1970s, and magnetic resonance imaging (MRI) today. These technologies have striking material differences, giving the impression that neuroscience has progressed in big strides. But they share a fundamental assumption: that abnormalities of brain form and human function are closely and predictably related.

This assumption may be accurate when, for example, linking a blood clot in a particular part of the brain to the sudden paralysis in a limb. But as Part 2 of the book explains, neuroscience does not stop there. MRI scanning is also used to examine the brains of children who have experienced social disadvantage, on the assumption that it will be possible to a) identify 'damage' caused by physical and emotional neglect in early childhood, b) conduct scientific studies to find ways of 'repairing' that damage, and c) intervene early to prevent long-term sequelae. The infant brain is depicted as 'precarious', necessitating a science of 'early intervention' and 'perfecting people' through interventions directed at the growing brain.

Enter epigenetics with echoes of Lamarck's pre-Darwinian notion, long thought to be discredited, that acquired characteristics can be inherited. Your genome is (broadly speaking) the genes that sit (mostly) on your chromosomes and (a little) on your mitochondrial DNA. Your epigenome is everything else needed for those genes to be expressed. Epigenetics — the study of how gene expression is modified by environment — is a shadowy character in scientific stories these days, because the link between 'environmental influences' (read: the social determinants of health) and adverse brain development is currently hazy.

The important thing to discover, say epigeneticists, is how particular environmental influences alter gene expression at the molecular level. Notwithstanding various 'breakthroughs' reported in the popular press, discoveries to date are preliminary. But it would appear that adverse environmental influences lead — for example, through a biochemical process called methylation — to sections of chromosomes becoming so tightly coiled that the genes on those sections are never expressed either by the individual who has experienced the disadvantage or by his or her children (and, perhaps, their children's

children). It would appear. Actually, as Wastell and White explain, experiments in this branch of science suffer from three recurring problems: small (and often uninterpretable) effects, lack of a plausible chain of causality, and lack of replication.

Putting aside the contested nature of the findings, the stage is set for a heroic story of saving future generations from the effects of disadvantage by reversing the biochemical processes that mediate it. Differences in MRI scan findings between disadvantaged and non-disadvantaged children have been hailed as evidence that material and emotional neglect leads (via an as-yet ill-defined set of chemical reactions) to physical damage in particular parts of the brain. And given that it occurs, it can surely be fixed by scientists. To that end, animal models are bred and studied (inducing and repairing lesions in carefully targeted anatomical sites) *'... to produce findings which seem to transfer so convincingly from the laboratory cage to the disadvantaged housing estate'* (page xii).

Meanwhile, in the parallel universe of the social sciences and humanities, a substantial evidence base has been accumulating for decades on the social determinants of health, the intergenerational cycle of disadvantage, the ethics of human rights, and the efficacy and acceptability of social and political interventions to address these issues — all of which are briefly covered. But as these authors point out, the neuroscience–epigenetics story is currently enjoying more legitimacy, attracting more grant funding, and beginning to cut more policy ice than the tired old structure–agency–identity and discourse–ideology–critique stories.

This book depicts the neuroscience–epigenetics train straying onto the social science track at rapidly accelerating speed. Will this train come to rest alongside other dystopian scientific narratives (such as eugenics, Tuskegee, and Porton Down) in a shameful historical siding? Or will the power-knowledge nexus that links super-science with the bright stuff of policy dreams take this train and its reductionist view of humanity crashing into the future? Only time will tell.

Trisha Greenhalgh,
Professor of Primary Care Health Sciences,
University of Oxford, Oxford.

Email: trish.greenhalgh@phc.ox.ac.uk
[@trishgreenhalgh](https://twitter.com/trishgreenhalgh)

DOI: <https://doi.org/10.3399/bjgp18X696065>