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Unexplored risk in the application of behavioural genetics to human learning and embryo selection

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“Edugenics”: Unexplored risk in the application of behavioural genetics to human learning and embryo selection

Eric Joyce

A thesis submitted for the degree of

DOCTOR OF EDUCATION

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Department of Education

2020

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The privilege of scholarship is the honest search for a little bit more of the truth and the better. If there are scary or even terrible things on that journey, working out what they might teach us makes the whole thing worthwhile. So thanks, Bath.

Abstract

Some leading behavioural geneticists propose the design of education around universal DNA testing. Their research and advocacy, referred to here as edugenics, revolves around the study of human genetic material in order to predict individual learning predispositions. This has attracted high-level UK government interest. The historical lineage of such scholarship runs from the first half of the 20th century when intelligence theory, genetics and eugenics were closely linked; through an apparent epistemological division between scientists and non-scientists; to later 20th century and early 21st century scientific ambiguity around issues such as race.

This thesis takes a long historical view. Its perspective is liberal but it employs both critical theory and critical race theory to help expose assumptions about race veiled in the edugenics literature. It explores themes of scientism, authorial gamesmanship and media amplification. Two devices employed by some geneticists to evade the charge of scientific racism are explored. It is suggested that the primary intended application of edugenics may be as a technology of embryo selection, where related products appear close to market. These devices, it is argued, do not of themselves invalidate edugenics research, but they do present unexposed risk to policymakers.

Contents

<u>Chapter One: Introduction, methodology, terminology</u>	p.6
1.1 Introduction	p.6
1.2 Methodology: selection and limitations	p.14
1.3 Gulf Conflict: scientific and non-scientific scholarship	p.16
1.4 Terminology: edugenics, edugenomics, edugenetics	p.24
<u>Chapter Two: The historical arc of edugenic literature</u>	p.25
2.1 Genetics, eugenics, edugenics	p.25
2.2 Edugenics scholarship	p.28
2.3 The lineage of edugenics	p.32
2.3.1 <i>Galton to The Holocaust</i>	p.32
2.3.2 <i>After the Holocaust</i>	p.36
2.3.3 <i>Jensenism, The Bell Curve, The MSI statement</i>	p.39
2.3.4 <i>Hereditarian vs anti-hereditarian discourse</i>	p.43
2.4 Edugenics over-reach	p.44
2.5 Discussion	p.48
<u>Chapter Three: Critical Theory and Critical Race Theory</u>	p.57
3.1 Critical Theory (CT)	p.57
3.2 Critical Race Theory (CRT)	p.66
3.3 Discussion	p.70
<u>Chapter Four: Colourblindness and Scientific Racism</u>	p.75
4.1 Colourblindness	p.75
4.2 Edugenics colourblindness	p.79
4.3 Scientific Racism	p.84
4.4 Scientific Racism 2.0 (SR2.0)	p.88
4.5 Discussion	p.97
<u>Chapter Five: Drawing together, Conclusion and Recommendations</u>	p.101
5.1 History Lessons	p.102
5.2 The Plomin Dilemma	p.106
5.3 Scientific Racism 2.0	p.109
5.3.1 <i>Social and popular media amplification</i>	p.110
5.3.2 <i>Purpose of SR2.0</i>	p.113
5.3.3 <i>Anti-hereditarianism and hereditarianism meet</i>	p.118
5.4 Genetic Determinism	p.123
5.5 Ethics	p.124
5.6 Politics	p.127
5.7 Conclusion	p.131
<u>Reflections</u>	p.135

Chapter One: Introduction, methodology, terminology

1.1 Introduction

The term “edugenics”, which I use in the title of this thesis and throughout the text, has been coined by me for the purpose of this thesis; it has no literary precedent as far as I know. My purpose is not to create a substantive new scholarly prism of some sort, but to provide a tacit label for coalescing and possibly transitory trends within behavioural genetics, education and embryo selection scholarship. As I describe in more detail below, my intention is to invoke caution in approaching the research I describe by linking it to the eugenics which I believe serves as one of its intellectual and scientific antecedents.

I argue in the thesis that some scholars use terms for the area of study in question, including educational genomics and educational genetics, which at first rush appear specific and unloaded but on closer inspection appear to me to be devices at least in part designed to avoid some of the difficult ethical questions raised by their research. This trend is related, I argue below, to a tendency amongst some scientific bodies and authors to employ a particular idea of eugenics as a means of separating genetics into ‘old’ and ‘new’, and thereby reducing the ethical risk implicit within the field of genetics research today.

My view, which I explore only at the margins of this thesis, is there is more utility in recognising the broadly eugenic nature of proposals made by some geneticists today in order to appraise them fairly, rather than evading key questions through re-definition. In this way, my call for caution by recognising the eugenic implications of some behavioural genetics research is not of itself a criticism of those scholars or fields; nor is it intended to suggest that a proposal may not be of worth because it may have eugenic implications. The intention is to make discourse around the subject more transparent by exposing the underlying imperatives involved in the nomenclature.

I chose the subject of this thesis having read into the work of Professor Robert Plomin, a leading behavioural geneticist of Kings College, London. Plomin is routinely listed as one of the world’s most eminent psychologists of both this century and last. He is the world’s best-known advocate for the use of personal genetic information in the delivery of

education. A leading UK government figure has described Plomin as the world leader in his field (Cummings, 2019).

Plomin and members of his much-published and cited laboratory argue that formal education should be structured around the results of early DNA testing combined with regular IQ testing. In this way, they say, education can and should be personalised around individual learning predispositions.

Behavioural genetic research at the molecular level, as conducted by Plomin and others around the world, is said to move beyond discourse about the relative strengths and weaknesses of the traditional study of twins for trait variation and correlation. It does this by analysing sub-gene material in DNA databases fast-growing in the wake of the mapping of the human genome, using now equally fast-growing computational power. In this way, researchers say they have been able to greatly expand observable correlations and variation, and to grow understanding of how specific genetic material interacts with each other and with the environment to produce phenotypic traits in individuals.

While much genetic research at present is concerned with possible innovations in the field of Health, edugenics researchers such as Plomin et al say their behavioural genetics research has the potential for application to social policy, notably education. Other behavioural geneticists are focussed upon different possible social policy applications, such as crime prevention.

As my reading progressed, I found a number of features of such literature striking. For example, edugenics literature claims to reflect the singular application of empirical scientific method but routinely extends into non-scientific commentary. Here, its apparent failure to apply appropriate epistemologies seems to lead it into direct conflict with contemporary societal norms around issues such race and determinism. This led me to select race as a focus for my thesis.

On the face of it, genetics research is sometimes felt to have produced few useful applications since what is usually described as the mapping of the human genome at the beginning of this century. But much steady work has been conducted in laboratories across the world and today innovative gene-editing technologies such as CRISPR (clustered

regularly interspaced short palindromic repeats) appear to provide near-immediate scope to intervene in the genetic make-up of humans; to create extraordinary new health therapies in respect of individuals and potentially their descendants too.

Researchers working in fields of health typically express considerable awareness that while they are solving technical and scientific challenges, the societies they live and work in must take decisions around whether each emerging technological possibility will enhance the way we live or may instead do harm. And regardless of how far policymakers go in integrating these new technologies into public spending assumptions there will naturally be limits. Therapies which intervene in particular cancers in living people, say, are likely to have different ethical and practical implications from those which may prevent the future occurrence of less serious chronic health conditions.

While the notion of what counts as a human enhancement, rather than treatment, is a nebulous one, it is certain that all relevant public expenditure regimes will involve thick red lines. Curing and preventing cancers is one thing, making people more physically attractive quite another. Access to some therapies seem likely to be dependent upon personal wealth much in the way that cosmetic dentistry and plastic surgery have been for many years. Societies must judge whether, or to what extent, to seek to regulate scope for tiered access to therapies and technologies in this way.

Moreover, the contemporary trend towards the use of artificial intelligence and vast computational power to spot claimed patterns and trends within the human genome seems to imply a requirement for society, and perhaps more immediately research funding bodies, to scrutinise the direction of travel of such research. This might include interrogating values implicit within algorithms or within the processes used by scholars to create new scientific categories.

For example, scholars in the United States recently produced a paper for publication entitled; “*A Deep Neural Network Model to Predict Criminality Using Image Processing*”. The paper uses facial recognition technology to identify a person’s predisposition to crime through genotypic and phenotypic traits. Its proposed application was crime prevention.

The publisher, Springer, withdrew the paper following a campaign by scholars concerned about the racial assumptions and implications of the paper (Beard et al, 2020). The scholars pointed out the preponderance of recent such work in spite of earlier broad scholarly agreement about the unexamined racial risk implied by the assumptions implicit within computational models (Fussell, 2020).

How could public officials responsible for law enforcement apply such predictive information were it available? It could surely only be by treating people differently, for example by creating new categories of possible offender, on the basis of their genetic make-up?

The paper included (BBC, 2020a);

"Identifying the criminality of [a] person from their facial image will enable a significant advantage for law-enforcement agencies and other intelligence agencies to prevent crime from occurring."

The authors, perhaps because it is not their forte, did not show interest in how their proposal would likely have profound effects on societies (imagine the authorities using extensive surveillance capabilities to keep a closer eye on you than others, or perhaps being required to avoid certain jobs or activities because of your genetic profile). And yet by arguing for application of their research to public policy they went beyond an exploration of the science, their scholarship domain, and entered into advocacy.

Such advocacy, unburdened by any references to public policy or political science literature, manifestly lies outside the authors' scholarly competence. Yet when such ideas are amplified through mass media this distinction is often lost. Scientists in this way sometimes present themselves as fearlessly pointing out the science when in fact they are making value judgements about how society should be. How society should be, in these terms, often involves the adoption in policy of their own research. This stretching of scientific scholarship beyond its natural elasticity is, in my view, an invalid move.

At a fairly early stage of my reading, I found this move present within the work of Plomin et al and others in the field of studying heritable human traits for educational purposes; a field I call edugenics for the purposes of this thesis. At one level, it is perfectly natural to

throw your own research at the public wall in the hope that some of it will stick by way of a useful application.

A clear dysfunction appears to exist, however, where scientists argue that some social application or other is inevitable, or where they seek to use claimed scientific method alone to contest scholarly objections to the policy application of their research. Here, a number of fallacies are often in play. An authority fallacy where apparently scholarly propositions are not supported by appropriate scholarship, for example. Or a contradiction fallacy where an assumption which hangs as the fruit of one epistemology is employed invalidly to prove an argument made in the context of a different one: For example, where a social construct is defined or refuted on the basis of claimed scientific evidence alone.

The economist Freidrich Hayek (1942,1943, 1944) popularised the notion of scientism as the erroneous application of scientific method to non-scientific fields of scholarship. This seems evident within edugenics. And perhaps as the flip-side of its advocacy, another striking feature of edugenics scholarship is its evasiveness. The purpose here seems to be to mask the social risk implied by the application of the claimed science as policy. Again, this seems an invalid move where the mass media is again often recruited to press home an argument which amounts to a claim for the pre-eminence of one interpretation of scientific method over other epistemologies.

Indeed, much of this evasiveness extends from another striking feature of edugenics scholarship, which is that the theory contains scholarly assumptions which are at the same time highly contentious in social terms yet reflect assumptions made across wider fields of study. Sometimes, it seems, concealed risk for edugenics is actually concealed risk within psychology and genetics as a whole. In this thesis, I use the socially constructed notion of race in humans to illustrate this point.

One assumption present within edugenics theory is that racial inequality, including in education, can in part be explained by the claim that on average black people have lower IQs than white. To many people, this is a straightforwardly racist assumption. Yet although it is contested, it is not an unorthodox one amongst psychologists and geneticists; nor in respect of the intelligence theory integral to edugenics scholarship.

What I refer to in this thesis as Scientific Racism 2.0 reflects a wider attempt by some geneticists to create a new and dominant public narrative around their trade. Such geneticists recognise the racial harm done by geneticists in the 20th century and seek to protect 21st century genetics from the charge of scientific racism. They do this, however, not by accepting the risk of scientism which appears to lay its heart. Instead, they couch race and racism in biological terms while veiling the ambiguity on the subjects still-extant within the field of genetics. This links closely to edugenics scholarship which has for a generation dealt with its racial ambiguity by simply ignoring the subject of race. Scientific racism 2.0 provides a new and more sophisticated way of dealing with the problem of scientific racism by claiming the unique right to name and define it.

Analysis of this problem in respect of edugenics assumptions yields what I call below the Plomin Dilemma. Namely, if the theory underpinning edugenics is correct then racial variation in IQ would in the application lead to a system of general education structured broadly along racial lines. And if it is incorrect, this suggests the presence of a fundamental theoretical flaw which would render it invalid as the basis of public policy.

A final striking feature of edugenics scholarship is that it invariably contains little or no reference to the literature of education. So while the scholarship of the science appears impressive, the scholarship behind its actual proposals for action are often simplistic and lacking in scholarly justification.

For example, broad and unevidenced statements claiming that improved support to children with learning difficulties will become possible though early DNA testing show no evidence of any understanding of how that area of education works at present. Other proposals are said to have no necessary policy implications, yet without reference to social policy literature or to how this conclusion has been reached. Assumptions about likely financial costs are even sometimes made, but devoid of any reference to where they come from.

The juxtapositioning of what appears strong scientific method with fallacies and ignorance about actual educational applications seems, at face value, a significant weakness in the literature of edugenics. However, I argue below that in fact it seems highly unlikely that scholars of Plomin's calibre miss this. Instead, these weak arguments may simply represent

a kind of authorial gamesmanship; a feint designed to draw the eye away from the more likely purpose of the research.

Edugenics appears to be essentially a dual, or multi, purpose technology. The science of CRISPR is, if you will, the surgeon's knife which does the cutting. Edugenics, which seeks to understand which genetic material does what, may one day tell the surgeon where to cut. Even so, engineering for human traits such as cognitive abilities, if ever possible at all, seem a very long way off as the sub-gene material which affects such traits are very widely dispersed. Meanwhile, public discourse around genetic engineering in general is, and seems likely to continue to be, robust.

Embryo selection, however, is another matter. At present, people undergoing In vitro fertilisation (IVF) select embryos for implantation with very little or even no knowledge of the difference between them. Some embryologists are developing ways of making a meaningful distinction. Rather than knowing the exact mechanism by which genetic features link to human traits, required for genetic engineering, probabilistic predictions based upon the presence of particular patterns within their DNA would for some represent a tremendous advance on the status quo. This, and not education, may be the true applied purpose of edugenics.

For example, geneticists have noted that tall people share particular genetic markers. Where such markers are present, a person is likely to be taller than most other people subjected to the same environmental conditions. The genetic markers are, on a probabilistic basis, highly predictive of height. Edugenics scholars, and other psychologists and geneticists, argue that this predictive validity applies to human cognition. Intelligence quotient (IQ), they say, correlates to many life outcomes. Edugenics is essentially about identifying which combinations of genetic markers predict higher IQ and related traits which help learning. If embryologists are able to offer prospective parents a prediction, with some degree of probabilistic accuracy, of which embryo will most likely produce the human with the highest IQ, it seems likely that many parents will wish to use that information to choose their IVF embryo/s for implantation.

Of course, the edugenics scholars may very well be wrong with their science. Their case is rooted in the socially predictive validity of IQ. This is often described as the hereditarian

view and is highly contested by scholars who argue that the correlations they ascribe to genotype are in fact a function of environment. Moreover, as all scholars stress, there is a world of difference between population averages and predictions at the individual level. Yet whether their contested science is correct or not, edugenic proposals are at present receiving considerable public traction and their ethical implications are considerable.

Notably, as this thesis argues, while edugenics scholars argue that their primary interest is in educational applications, their arguments appear peculiarly thin in this respect; while the social risk implied by their proposals appears high. This does not seem naturally fertile ground for policymakers. Instead, it seems more likely that their true purpose may be the creation a new technology of embryo selection.

If this is the case, the scientism lies not in the feint in respect of education, but in the attempt by edugenics scholars to apply claimed scientific method alone to the profound social question of embryo selection which requires both scientific method and non-scientific epistemologies to answer.

To conclude this introduction, I expose three of my own axioms and value judgements. These do not affect the logic of the thesis, but they do play into my approach and the thesis' structure.

First, there is much discussion about race and racism below. I explore these issues from intellectual and structural perspectives and at no point imply any racism on the part of scholars. Personal allegations, particularly against some intelligence theorists, are rife amongst some geneticists and are almost always unhelpful in respect of understanding the scientific claims.

Second, when gauging human progress as a whole, I place progress on racial equality above economic prowess and technological innovation. These notions are not mutually exclusive, but I emphatically reject the pre-eminence often given to the latter two in public discourse; without progress on racial equality there is in my view no progress at all.

Third, I do not criticise per se the idea of new technologies of embryo selection. IVF doctors will soon know vastly more about which embryos have a better chance of having

particular traits. In these circumstances, a blanket ban on informing parents about cognition and other probabilities may be politically and ethically undesirable. It may be wiser to engage in constructive discourse around future technological possibilities, while employing the language of eugenics in order to expose attendant but presently sometimes veiled ethical and social risk.

1.2 Methodology, selection and limitations

This thesis is about the unexplored and uninterrogated non-science aspects of edugenics. Edugenics is a means of referring very specifically to the area of behavioural genetics examined by this thesis and not an aggrandising attempt to create a new generalisable perspective. It consists of the published literature of behavioural geneticists inquiring into, and advocating, the use of personal genetic data in education. The broad methodology of the thesis is critical literature analysis. The reader is invited to follow a historical narrative and to see the subject through the prism of historical scientism and racism in order to illuminate unexplored social risk within contemporary edugenics.

The thesis begins by describing edugenics through an exploration of key texts. It places edugenics into the context of its intellectual and historical lineage and shows how it extends from the same broad milieu as eugenics old and new. This historical approach is taken to show both the purpose of eugenics and the modus operandum of pre-World War 2 geneticists. It is also designed to show how the phenomenon described as scientific racism is integral to the theory edugenics rests upon.

The next stage explores the methods, or perspectives, which will be taken to analyse edugenics. The literature of Critical Theory (CT) flags and informs the broad approach, while it also shares historic time and place with that of eugenics. The literature of Critical Race Theory (CRT) also shares later historic time and place, and it provides the perspective applied in the next stage.

One of a number of unexplored and evaded risks within edugenics research is selected, that of race, to serve as an example of a wider structural weakness. This section employs a critical approach informed by CRT. The approach red-lines Marxist criticisms of the philosopher Jurgen Habermas for reasons of relevance and length. CT and CRT are

nothing if not practical and this is perhaps their defining distinction from postmodernism. Epistemological confusions, scientism and the amplification of tactical arguments through mass media are considered.

The conclusion makes inferences and draws arguments from the literature above. It suggests that the primary purpose of edugenics is most likely to facilitate highly predictive embryo selection. If scientifically valid, some useful function with medically diagnosed learning challenges may arguably not be ruled out; this would come with attendant ethical risk, however. The thesis draws tacit conclusions and makes points for further study about wider scholarship within fields relevant to edugenics. And it criticises some geneticists on the basis of Habermas' notion of strategic communication.

This critical approach to the literature was selected because the intention is to expose risk and intention within an important field of scientific literature; to illustrate the importance of selecting appropriate epistemologies in non-science research; to show scientism in action and to exemplify such wider phenomena as how scientists sometimes work through the media to create a public narrative around their trade.

There was scope for a different approach to the notion of scientific racism. Had the thesis been longer, it would have been possible to test conceptions of scientific racism through qualitative research. This would have been a useful addition but was not practicable given the shape and length of the thesis. An additional reason for rejecting qualitative research methods was what the author felt was a challenging context for achieving the appropriate ethical clearance given the subject of race.

Literature which critiques the scientific scholarship of edugenics is mentioned but not at length. The purpose of this thesis is not of itself to adjudicate between scientific theories since there is much literature on this subject at present, but to explore one and thereby show its evasions, gamesmanship and likely purpose.

Historical antecedent is important to this thesis. Hayek's warning about scientism came at a time when geneticists supported old eugenics virtually to a man (they seem all to have been men); when a majority of doctors in Germany had joined the Nazi party and scientists had built a genocide machine; when politically disengaged leading physicists had sought to

provide the same political regime with a nuclear weapon; and when a quarter of a million people were about to be vapourised by science's latest miracle. In each case, scientists retrospectively claimed they were shocked about how their science had been applied. Geneticists who had almost universally supported eugenics suddenly discovered that eugenics had in fact been both a monstrosity and a terrible misunderstanding of genetics.

The thesis is less deep in its references than perhaps ideal. A longer thesis would do the literature more justice. The breadth of this thesis was necessary to show the cyclical nature of the problems which serve as the backdrop to edugenics, and to place aspects of science into the necessary longer historical narrative.

The thesis is shaped to provide considerable historical narrative and of course this could be taken as bias. It is hoped that the latter is avoided, but the thesis does seek to be practical in the spirit of CT and CRT. The author's broad perspective, however, is a liberal one.

1.3 Gulf Conflict: scientific and non-scientific scholarship

This thesis explores the application of behavioural genetics scholarship to education. In doing so it criticises scientism, or the inappropriate employment of scientific method where other epistemologies apply. To this end, it identifies where theories put forward by some scholars extend beyond the constraints set by their own scientific methodology, and where there are faults of omission or reasoning. In addition, it shows where a theory may reasonably be considered orthodox, if contested, amongst scholars within the relevant field.

Some geneticists are criticised for an invalid attempt to sweep some socially difficult scientific assumptions contained within psychology and genetics under the carpet in order to protect their own field of scholarship. These arguments are often strikingly binary; a thing is said to be real if it extends from scientific method and simply an opinion if it is not.

It is argued that such reductions are often based on a misunderstanding of epistemology. At other times, they are based upon an incomplete and over-confident expression of a claimed

gulf between scientific and non-scientific scholarship. This gulf was expressed in CP Snow's 1959 lecture and book *The Two Cultures* (Snow, 2012; Jones, 2009).

In an ironic nod to near-timeless confusion around this subject, *The Guardian Newspaper's* famous motto; "Comment is free, but facts are sacred", is often (Hume, 2012, p106; Mui Hoong, 2014) misattributed to Snow. In fact these words were delivered by former *Guardian* editor CP Scott in 1921, when Snow was 16 years old. Scott was talking about something else altogether.

Scholars employing scientific method today seek to establish empirical facts ostensibly through observation and inductive reasoning. There are process rules which govern the conduct of scientific research. It is carried out within a theoretical framework which itself is part of a larger, some scholars say time-dependent, orthodoxy. By continuously testing these orthodoxies, researchers seek to knock out anomalies; in this way they refine theories and fill out empirical knowledge in their field as they go.

Sometimes, this knowledge is referred to as facts, as opposed to opinion. Hence, one presumes, the confusion around the two similarly-named authors above. Researchers often avoid this step because it can introduce unnecessary and unhelpful ambiguity into their work. Some scientists today, notably edugenics scholars, are influenced by the logical positivism of Vienna Circle scholars such as Rudolph Carnap (Kitchener, 2004), insofar as they require rule-based philosophical tools to reason validly from their observations. Their understanding of the relationship between their results, their own subjective ideas and other epistemologies varies. On the whole, scientists prefer to keep to the science although sometimes, as with edugenics, they express views on other fields of scholarship. There is naturally risk involved in the latter. The Nobel Prize winning scientist EO Wilson unintentionally provides a fine example of this risk.

In an article entitled; "The Biological Basis of Morality" (Wilson, 1998), drawing on ideas expressed at more length by him in a popular book the following year (Wilson, 1999), EO Wilson applies his world-leading scientific scholarship around ants to ethics, morality, philosophy and religion. His thesis is that philosophers throughout history who have emphasised the transcendental did so because they did not know enough about biology.

Had they done so, they would have accepted that morality and ethics arise as a function of genetics and epigenetics.

It is, one might say, a bold argument. The article was published in The Atlantic magazine and not in a peer reviewed journal.

In a tract dedicated to skewering the transcendental, Wilson begins by channelling Cave's; "I don't believe in an interventionist God", published the previous year (Cave, 1997). Wilson says that he believes in God but this does not run counter to his anti-transcendental thesis. Science, he says, will in due course prove God's existence. And He will be proven to be non-interventionist. God is the creator alone, Wilson says, because science takes over with the messy business of the real world. Although Wilson briefly mentions Aquinas' Summa Theologiae, he does not discuss the possibility that Aquinas' argument from design, within that compendium, has traditionally be interpreted as contributing to an established theological argument that God is indeed interventionist. Notably, Wilson does not explain why science will likely prove the existence of God but will also prove that the deity did not intelligently design the genetic and epigenetic phenomena and all that flows from it. This seems philosophically and even theologically unsatisfactory.

Wilson then moves briefly on to Hume's 'is-ought problem', the notion that a moral 'ought' may not be derived from a scientific 'is'. He does so in a short order which would certainly have saved Searle (1969), Pigden (2010) and many other scholars down through the years a lot of time they never got back.

"We do not have to put moral reasoning in a special category and muse transcendental premises, because the posing of the naturalistic fallacy is itself a fallacy. For if ought is not is, what is? To translate is into ought makes sense if we attend to the objective meaning of ethical precepts. There are very unlikely to be ethereal messages awaiting revelation. Or independent truths vibrating in a nonmaterial dimension of the mind. They are more likely to be products of the brain and culture" (p.37).

In the most elementary of ways, the posing of the 'is-ought' problem is manifestly not a fallacy as Wilson argues. A simple answer to; "if ought is not is, what is?", is "anything we choose. That's precisely Hume's point". Indeed, Wilson's whole passage here is a fallacy in which he seeks to prove the superiority of his epistemology over another by an appeal to the rules of his own epistemology. He compounds this weakness throughout the article by

arguing that the work of philosophers from Kant to Rawls was fatally flawed by their failure to provide scientific evidence for their arguments.

Throughout the article, Wilson picks up and dismisses philosophical arguments of historical profundity in quick time. It is an extraordinary piece of writing for a Nobel laureate. He is of course entitled to argue for genetic determinism and this would be consistent with the broad sociobiological philosophy he helped originate. But at root, his argument that genetics create moral instincts which leave us without the ability to choose is pure polemic. It is really insufficiently coherent to stand even as a hypothesis. As a side-issue, it is incompatible with his broad thesis that only good things will come from proving scientifically what is morally right and wrong.

Wilson points out that transcendental thinking has led to some bad outcomes, but does not mention the rape, killing and torture which is certainly present naturally, and presumably genetically determined, throughout the animal kingdom. His conception of morality essentially negates the notion of morality as we know it. It does not even account for scientific scholarship, such as in the field of quantum theory, which would surely have great difficulty with the supreme degree of prediction he believes genetics provides.

Wilson's argument gives the appearance, at the very least, of extending from the scientism of an eminent scientific scholar in late career, fed up with toeing the line on different theories of knowledge and who has decided to have a go at creating a theory of everything. Notably, and this will be referred to below, he uses the device of a popular media journal rather than a peer-reviewed philosophy journal. This enables him to avoid scrutiny by serious scholars, who will understand how such articles provide a licence to speculate beyond the strict boundaries of scholarship, but to influence public discourse.

Today, Wilson's ideas for "consilience" between science and non-science scholarship are influential at the highest level of UK government and serves for some as an intellectual infrastructure upon which edugenics is overlaid (Cummings, 2019).

To be clear, it is argued in this thesis that edugenics scholars such as Plomin do not quite fall into the chasm Wilson does. They may think it, but they do not say it. Other writers

who amplify such messages in the media domain, such as Rutherford (2020), do however and this is explored at Chapters 4 and 5 below.

In his tract, Wilson is in fact attempting to deal with what he regards as a binary problem. He wishes to achieve “consilience” between the scientific and the non-scientific epistemologies through a takeover by his own scientific perspective. His attempt is based upon subordinating the non-scientific to scientific method and thereby somehow rescuing it. He wishes to put what he sees as non-scientific epistemologies through a scientific washing machine and pull them out again cleansed of unscientific thinking and now somehow fit for purpose. As is characteristic of scientism, Wilson has spent too little time trying to understand scholarly fields, literature, paradigms, epistemologies and even scientific perspectives which are not his own.

The significance of his effort lies not in its obvious failure, but in his failure to recognise what many contemporary scientists do: namely, that even the most scientifically sound facts and theories are conditional and theory dependent; and that the binary phenomenon, the gulf, he sees is itself a human construction.

Below at Chapter 3 this thesis will explore how German scientists such as Werner Heisenberg developed quantum theory in part as a consequence of their rejection of cultural and intellectual orthodoxies pressed upon Weimar Germany by the First World War victors. They relied heavily upon the logical positivism of the Vienna Circle, although later saw flaws in its failure to account for the way science, other epistemologies and human experience intersect.

At the same time, and against the notion of philosophy and enlightenment thinking as essentially the handmaiden of science, was ranged scholars of the Frankfurt school such as Max Horkheimer and Theodore Adorno. These scholars were concerned that unvarnished positivism and enlightenment rationality was leading to a Nazi catastrophe where scientists and doctors were competing for influence within a regime soon to commit atrocities against humans on a staggering scale. In due course, post-war, science and non-scientific scholarship did indeed find accommodations which took account of both the value of scientific method and the importance of understanding its conditional context.

Chalmers (2013) points out that historical accounts of scientific advances show they have not come from the simple process of gathering observations and dispassionately constructing theories around them. He notes that much of Galileo's ostensibly experimental work, for example, in fact came in the form of abstract thought experiments. He argues that observation is affected by the perspective of the observer, and that the truth of observation judgements is judged by reference to what is believed to be true, so the observable is rendered as fallible as the underlying presupposition.

In practical terms, many of these problems can be mitigated through trained observation, public scrutiny, an acceptance of the need or scope of revision, the minimising of subjectivity and good experiment design. But since scientific truths are all subject to revision then they are conditional; repetition is useful but does not remove contingency altogether. Induction involves making inferences about the unobservable and the need for induction to be justified by induction means that in practical terms 'scientific truth' is better qualified as 'probable truth' or even 'best (available) truth'.

Popper's "falsifiability" (Popper, 2005), where logical validity is contingent upon the possibility of falsification, constituted a major contribution to understanding the intersection between science and non-science, particularly in a post-genocide context. The Duhem/Quine problem, Quine's exploration of an earlier idea by Duhem (Harding, 1975), argues that a complex theory is not falsified where the falsification may extend from a flaw in an interconnected theory, or auxilliary assumption, and not the theory under test.

Lakatos (Chalmers, 2013; p.84) points out the scope for continuous denial of falsification by deflecting the problem on to an endless series of hypotheses rooted in the auxilliary theories. Moreover, theories can be falsified using present theories which turn out to be wrong. By way of example, Astrology is falsifiable. Theories must therefore be both falsifiable and not falsified. Finally, it is left to the falsifier to decide which part of a complex theory is falsified. This leaves little scope for practical advance when in fact it may be that the overall structure remains intact.

Chalmers argues that science is best understood through the theoretical constructs which contain them:

“A case could be made to the effect that the typical history of a concept, whether it be ‘chemical element’, ‘atom’, ‘the unconscious’ or whatever, involves the initial emergence of the concept as a vague idea, followed by its gradual clarification as the theory in which it plays a part takes a more precise and coherent form” (Chalmers, 2013, p.99).

Kuhn’s paradigm shift solves some of the problems of Popper’s falsification. Here, “normal” science takes place within an orthodox scientific paradigm; flaws and anomalies are ironed out through experiment; eventually, though, too many flaws appear and the meta-theory is threatened, then a new consensus forms around a revolutionary new paradigm and normal science again takes place in this new context.

Scientific advance, within this paradigmatic context, has the benefit of substance over time which in turn allows normal science to correct errors and fill out the detail and apply the science to practical pursuits. A perceived weakness of Kuhn’s paradigm shift is that it can become lost in relativism. If, as he says, no notion within one paradigm can be justified on the basis of another, then revolutionary paradigm shift does not necessarily entail progress.

This question lies beyond the scope of this thesis. However Lakatos (1976, 1980) developed Popper’s falsification and sought to deal with the relativism of Kuhn’s paradigm.

Lakatos’ “research programme”, in effect an updated Kuhnian paradigm, proposed a “hard core” and a “protective belt” of concepts and theories within an overall programme. The negative heuristic guides the scientist not to challenge the hard core, the positive heuristic guides towards the actions needed to shore up the hard core. Here, the hard core is able to survive failures of prediction, by ascribing such failures to the protective belt. In this way, in the practical terms accepted by this thesis at least, scientific progress can be seen through the collapse of one paradigm and its replacement by another but with the latter accompanied by surviving orthodoxies which existed within the previous paradigm. Lakatos’ research programme casts objectivity not simply as empirical, but as inter-subjective understanding through the open inspection of methods.

It will be argued below, however, that in the midst of this practicable post-war progress, the notion of a clear binary divide between science and non-science, with the former often

in the ascendant and in the EO Wilson mode, is often prevalent in the public presentation of genetics scholarship.

1.4 Terminology: Edugenics, edugenomics, edugenetics, intelligence

Scholarly proposals to design education around genetic testing (Plomin, 2018), to select human embryos for educational performance (Devlin, 2019; Ball, 2019) and, arguably, to deploy human genetic engineering for intelligence and educability (Cocker, 2019) employ the same behavioural genetics research (Hsu, 2014; Cummings, 2019).

On the basis that such research presents multi-function social and ethical risk analogous to “dual use” in arms exportation regimes (Fiott & Prizeman, 2013), the term Edugenics in this thesis refers to the application, in any way, of behaviourist genetic research for educational outcomes.

This term, with its etymological debt to eugenics, is designed to sound a cautionary note extending from the principle, implied by Agar’s “*liberal eugenics*” (Agar, 1998), that it is better to confront directly those questions of ethics and risk which accompany new research and technology than to conceal or evade them through euphemisms.

Here, edugenics is intended to convey the imperative that any consideration of the application of genetic or genomic research to education involves important questions of ontology, epistemology, methodology and ethics; and many other value judgements besides.

Some edugenics scholarship deals with the principles and broad nature of relationships between each person’s whole genome and their education: *edugenomics* in this paper (Grigorenko, 2007). Other scholarly work (Belsky et al, 2016; Selzam et al, 2017) is concerned with what is referred to here as *edugenetics*: the actual or potential function in education of sub-gene genetic information. Many authors engage the field from both perspectives (Petrill and Justice, 2007).

Edugenics scholars stress the what they claim is the highly predictive function of general intelligence, or ‘g’. This, as mentioned above, is a highly contested matter where

hereditarians stress the importance of inherited genotypic traits and anti-hereditarians stress the dominant role of the environment. Typically, an environmental approach has dominated public policy although the hereditarian argument has gained popular traction every generation or so over the last century. Notably, however, as with what will be described as Scientific Racism 2.0 below (Birney et al, 2019; Rutherford, 2020), some scholars who claim to be anti-hereditarian appear in fact to accept virtually all of the hereditarian premises. Here, the claim seems to be an authorial device aimed at entrenching hereditarianism while avoiding some of the less publicly palatable implications of the term.

Chapter Two: The Historical arc of edugenic literature

2.1 Geneticists, Eugenics, Edugenics

Eugenics had a disastrous 20th century. Geneticists, other scholars and public figures who were proponents sought to benefit society through the mechanism of human trait heredity. They promoted the utilising and replicating of human genetic material judged desirable and the suppressing of that judged undesirable. An important feature of eugenics was that supporters sought its application through state agency. That is to say, force.

In the 19th and 20th centuries, eugenics amounted to the social operationalising of the evolving science of genetics. The science was flawed. For example, that the Hardy-Weinberg 'equilibrium' principle determined that adverse genetic human conditions would be selected for very slowly and would appear randomly was well-known by the mid-1920s. It followed from this that attempts to reduce adverse occurrences on a society-wide basis through, for example, sterilisation, would be unsuccessful. The standard response of geneticists, however, was not to reject eugenic theory on this basis, but to reframe it.

"It is true that many eugenicists were muddled about genetics. But what about the host of respected geneticists, such as R. A. Fisher in the United Kingdom, Erwin Bauer in Germany, Herman Nilsson-Ehle in Sweden and Edward Murray East in the United States, who championed eugenics long after the implications of the Hardy-Weinberg principle were understood? The insight that selection is slow when genes are rare originated in 1917 and was popularized in the 1920s by J. B. S. Haldane in the United Kingdom and H. S. Jennings in the United States. Yet in the 1920s and 1930s, nearly all geneticists, including those traditionally characterized as opponents of eugenics, took it for granted that 'mental defectives' should be prevented from breeding....it was possible to recognize all these flaws and still remain a eugenicist. After 1920, it was well understood that most genes for mental defects would be hidden in apparently normal carriers. For most geneticists this seemed to be a good reason to widen eugenic efforts rather than abandon them" (Paul and Spencer, 1995, p.302, 304)

In this way, uninterrogated value judgements, some of which reflected the orthodox and racist assumptions of the time, were normative within the scholarly assumptions of such geneticists and in their eugenic prescriptions for public policy.

Scientific arguments were advanced to justify ideological arguments about racial superiority and inferiority (Mazumdar, 1992). These were primarily around intelligence and other traits which were believed to affect educability and many other life outcomes.

Today, edugenics scholars, mainly behavioural geneticists, claim to apply contemporary genetic science to education. They do not rely, they say, upon the flawed science of old eugenics. However, in the case of proposals to construct general education around early DNA testing, and unlike Agar's liberal eugenics, they cleave to the notion that the state should take an active role (Asbury and Plomin, 2013).

It will be argued below that, in the literature, edugenics scholars invariably move from an explanation of their scientific results directly to an assumption that such results should be applied to education (Gaysina, 2016; Plomin, 2018; Rimfeld & Malanchini, 2018). There is a vacuum in respect of social policy and other literature necessary to inform scholarly progress from results to application. This appears to be a 21st century expression of Hayek's scientism mentioned in Chapter one.

Some scholars who express disagreement with or scepticism about edugenics nevertheless regard such developments as now having an unstoppable momentum:

"The floodgates of genetic data have opened. It is our opinion that education will undoubtedly be affected" (Martschenko et al, 2019).

A common feature of such critiques, however, is that they often themselves fail to consider the social and political theory necessary to inform the scholarly judgement. It is not possible to make a scholarly judgement about whether a thing is likely in policy terms, or whether it has policy implications or not, without referring to relevant social policy literature.

For example, the Overton window (Russell, 2006) is often used in fields such as health scholarship to gauge policy relevance and practicability (Morgan, 2019). This author has been unable to find any references to any such device, or indeed any relevant social policy literature at all, in edugenics literature.

More specifically, it will be suggested below that while edugenics literature makes frequent claims of policy neutrality, in fact this is to conceal its more likely place as part of a conservative, or indeed neoliberal, worldview.

Lauder (2020) employs the perspective of the Lakatosian research programme to argue that while neoliberal thinking in education may have rested on firmer intellectual grounds at its instigation a generation ago, today its hard core is crumbling through its reliance upon Human Capital Theory and the failure of education marketisation to date to deliver the wide socially beneficial outcomes the research programme predicted. It is suggested at Chapter 5 below that edugenics may fit into a wider pattern of attempted policy formulation which reflects this crumbling theoretical hard core. Of particular interest in this respect is the displacement of scholarly sources by non-scholarly publications and government sponsored mechanisms in shoring up government policy ideas.

Viewed through the prism of the Overton window, however, it is not implausible that the qualified application of genetic research to education, for example to identify and help children born with otherwise debilitating learning difficulties (Middlecorp et al, 2016; Stergiakouli et al, 2016), could command public support. This could naturally apply whether or not such research was useful in practice, or even valid in itself.

Notably, while the wider use of new gene-editing technologies such as CRISPR and the idea of embryo selection for intelligence remain the subject of controversy and proposed moratoria (Caplan et al, 2015; Cohen, 2019; Shulman and Bostrum, 2014; Jaarsma and Welin, 2013), the use of advance DNA tests in education has already begun to enter the margins of classroom practice (Callier, 2012; Wright et al, 2019).

The extensive ethical treatment of the former two technologies has not been visible in this steady advance towards the introduction of advance DNA testing into the classroom. With cheap DNA testing already widely used by consumers to access health advice, it seems at least possible that this may well find early wider adoption.

2.2 Edugenics scholarship

The period since the mapping of the human genome in 2004 has seen considerable growth in research into the possible application of genetic and genomic research to education; or edugenics. The field is dominated by behavioural geneticists studying human trait variation.

Prior to 2004, the primary methodology was twins studies (Trouton et al, 2002; Neal & Cardon, 2013). Here, the traits of zygotic and non-zygotic, or identical and fraternal, twins are studied in order to separate the functions of heredity and environment. Where the traits of identical twins vary the role of the environment can be apportioned. Conversely, where environmental conditions are the same, variation can be assigned to genetic heredity.

Since 2004, Genome Wide Association Studies (GWASs) have taken advantage of rapidly growing commercial DNA banks where members of the public provide voluntary samples. This enables scholars to analyse patterns within very large datasets using ever-greater computational power (Bush and Moore, 2012).

Such datasets are today collocated and catalogued to facilitate a high level of interrogation by scholars (MacArthur et al, 2017). These assets are used by geneticists to study human trait variation at the molecular level in order to identify, for example, multi-factorial relationships between genetic coding and human health outcomes (Raat et al, 2010; Freedman et al, 2011).

An early search for simple associations between a single gene and a particular condition, an ‘intelligence gene’ or a ‘gay gene’ were popular media chaff, have given way to the study of the combined polymorphic effects of sub-gene material.

Single Nucleotide Polymorphisms (SNPs) are variations in alleles caused by substitution at particular points along the human DNA sequence. Researchers say can together have predictive value in respect of health conditions.

“SNPs are the most common type of genetic variation among people. Each SNP represents a difference in a single DNA building block, called a nucleotide thymine

(T) in a certain stretch of DNA...they occur once is every 300 nucleotides on average, which means there are roughly 10 million SNPs in the human genome. Most commonly, these variations are found in the DNA between genes. They can act as biological markers, helping scientists locate genes that are associated with disease” (NIH, 2018).

Geneticists analyse GWASs for correlations between the presence of these markers and that of health conditions such as cancer. While geneticists seek to understand the function and interaction of SNPs, the emphasis within behavioural genetics is upon observing the correlations themselves.

So, for example, human height correlates to around 20,000 identified SNPs. The presence of SNPs in particular combinations permit a high degree of predictive validity in respect of height outcomes (Lello et al, 2018). This validity is a matter of probability and based on the presence of particular SNPs, rather than geneticists understanding how the SNPs actually work on height. The same principle is applied across the field of human health (Pharoah, 2013; Hagenaars et al, 2016).

Some behavioural geneticists, often psychologists by scholarly background, apply these techniques to education. A key variable is Intelligence Quotient (IQ). Here, Spearman's (Jensen, 1993) notion of general intelligence, or 'g' (Gottfredson, 1998), is linked to the presence and patterns of SNPs to provide what researchers say is a high degree of predictive validity in respect of educational, social, economic and many other outcomes (Gottfredson, 1998; Sternberg & Grigorenko, 2002; Plomin, 2018; selzam et al, 2017; von Stumm et al, 2020).

Spearman's innovation was to observe that people performed similarly well in different types of test:

“Central to Spearman's work is his observation that people perform similarly well on tests measuring different aspects of cognitive ability such as working memory, problem solving and spatial tests involving puzzles. Deploying his own Factor Analysis (Harman, 1976), Spearman concluded that each individual's cognitive ability is influenced by a number of specific single-task variables and by environmental variables such as nutrition, but crucially that around half is the result of their genetic make-up. This is general intelligence, or 'g'” (Joyce, 2018, p.8).

General Intelligence, ‘g’, is measured through psychometric testing, commonly known as ‘IQ’ tests. IQ is the most pervasive expression of intelligence, although rival theories exist (Gardner, 1990, 1992, 1994) and it is important to place IQ into this wider context.

There are many theories of intelligence (Spearman, 1927; Cattell, 1971, Ciancolo & Sternberg, 2004), but edugenics scholars work in the tradition of Spearman’s ‘g’. They do not in theory deny the possibility of other intelligences, but their work is dominated by the claimed predictive validity of ‘g’.

Gardner’s notion of multiple intelligences, on the other hand, provides a conception of intelligence based upon a range of learning modalities. He does not seek to refute the correlations expressed by ‘g’, such as between the “*logical-mathematical*” and “*verbal-linguistic*” modalities. He argues, however, that some modalities have much weaker relationships with ‘g’. These include the “*bodily-kinesthetic*”, which influences physical movement and skill, and the “*musical rhythmic*”.

Some psychometricians (Allix, 2000; Gottfredson, 2006) note that Gardner’s multiple intelligence idea has not been supported by empirical evidence, and argue that ‘g’ accounts for at least some of Gardner’s non-IQ modalities (Visser et al, 2006). Gardner does not dispute these points and accepts that judgements about non-IQ modalities remain subjective. Critics (Gottfredson, 2006) suggest that those intelligence modalities of Gardner’s which do not correlate to ‘g’ simply amount to re-naming aptitudes as intelligence.

However, Gardner’s conception of intelligence is sensitive to cultural context and exposes at least one potentially circular feature of the claimed predictive validity of ‘g’. That is to say, if ‘g’ is socially predictive, this may in full or part reflect that society has been constructed to favour the traits of those who had most power in the constructing. It may follow that societies constructed along different lines and with different imperatives may show much weaker correlations between ‘g’ and social outcomes.

Moreover, Gardner’s conception raises the question of when judgements about a theory’s accuracy or predictive validity should be made. This encompasses Lakatos’ emphasis upon time-bound contingency. Here, Lakatos’ emphasis upon power relations appears, to

scholars whose aim is to lessen social inequality, to commend Gardner's conception of intelligence as a heuristic device or starting point. This is not necessarily to deny that 'g' has validity and utility, but to place it lower on the hierarchy of cause and effect than structural variables which lend themselves to socially unequal outcomes. Notably, Gardner's approach places a greater imperative on more inquiry in respect of the group IQ differences claimed by hereditarians, for example where deeper questions about the values and assumption implicit within algorithms may throw considerable light on the subject.

While edugenics scholarship makes a superficial appeal to social justice, as discussed below, it both extends from a wholesale acceptance of the validity of 'g' and rejects claims that 'g' is culturally bound. Alternative conceptions of intelligence are regarded as without scientific foundation but are in theory at least not wholly rejected as possibilities. As noted, however, hereditarians (Gottfredson, 2006) tend to criticise non-IQ conceptions of intelligence as wordplay, where sporting and musical aptitudes are re-labelled as alternative conceptions of intelligence.

A full exploration of the idea of intelligence is beyond the scope of this thesis, although it is suggested below that edugenics scholarship is at best unclear in its social intent. Moreover, it is argued that a faux distinction exists between hereditarian scholars and some ostensibly anti-hereditarian scholars since both groups stress the special place of 'g'.

In all events, intelligence is a highly-contested idea. Meanwhile, the purpose of this thesis is to examine edugenics scholarship and so psychometric 'g' is referred to often.

Alongside, IQ, non-IQ variables, such as determination, or Grit (Rimfeld, 2016), are also studied by edugenics scholars and this augments the SNPs correlated to IQ. This, they say (Plomin, 2018), shows how many phenotypic traits which appear to extend from the environment are genetic in origin and enhances the extent to which they are able to predict educational performance.

Edugenics scholars propose constructing children's mandatory education around universal pre-school DNA tests supplemented by continuous IQ tests (Plomin, 2018; Selzam, 2018). The same researchers, some influential at the highest levels of the present UK government (Cummings, 2019), argue that the application of genetic information to education is now

inevitable (Plomin, 2018; Selzam, 2018). Some are associated with scholars (Hsu, 2014) studying the field of embryo-testing where in vitro fertilisation (IVF), recipients select embryos according to trait prediction (Yong, 2013).

It is a matter of orthodoxy, although not uncontested, within the psychometric testing literature that there exists a racial hierarchy of general intelligence. In IQ tests, it runs, people who self-define as black score on average lower, likely significantly so, for general intelligence than those who self-define as white or asian. This provides predictive validity and apparent explanatory power in respect of the average poorer educational, social and economic outcomes (Flynn, 1999, 2010; Dickens and Flynn, 2006; Nisbett et al, 2012). Implicit within edugenics literature, and present within wider genetics scholarship, is the notion that this racial variation is likely partly caused by genetics (Gottfredson, 1995; Plomin, 2014; Plomin, 2015). This is explored below.

2.3 The Lineage of edugenics literature

2.3.1 Galton to The Holocaust

The term “eugenics” was coined in 1883 by Sir Francis Galton (Galton, 1883; pp.24-25) to refer to what he later refined thus; "*Eugenics is the study of the agencies under social control that may improve or impair the racial qualities of future generations either physically or mentally*" (Galton, 1904, p.81).

The term’s primary usage since then has reflected Galton’s own emphasis upon the proposed application of policies informed by such study. This includes the belief that the cause of human progress is served by seeking to improve human stock through intervention in the transmission of heritable genetic traits, in order to increase the incidence of desirable ones and decrease that of undesirable ones.

Galton was influenced by the epochal natural selection theory of Charles Darwin, with whom he shared a grandfather and who in return endorsed Galton’s arguments on the heredity of human intelligence (Rose, 2009). Galton placed intelligence and education at the core of this theory, although he stressed the importance of other human traits in species success too (Gillham, 2001).

The primary means of intervention promoted by Galton were the selective breeding of the more intelligent members of society and the constraining of breeding among the less intelligent. Since Galton assumed domestic social stratification reflected genetically informed intelligence, he proposed that the middle and higher social orders reproduce more and the lower social orders less. And because he also assumed, following the Swedish scholar Linnaeus (Linnaeus, 1758), that there existed a hierarchy of racial categories rooted in intelligence, genetics and biology, he proposed encouraging white people to breed more and black people less.

Galton's scholarship was rooted in the scientific study of human heredity, most notably what he considered to be genius (Simonton, 2003); this naturally included himself. It was characterised by the early application of scientific method and serves as an example of the rapid growth of scientific method in late-Victorian England (Lightman, 2008).

Many of Galton's broad theories and insights have had a substantial influence upon modern scholarship, notably psychometrics. Goldstein (2012) notes that the tradition of factorial analysis generating the theory of intelligence, 'g', followed by edugenics scholars such as Robert Plomin today, is essentially that originally proposed in principle by Galton, developed during his lifetime by Spearman, then developed by other scholars since. This is the tradition which saw the design of many modern psychometric tests in wide usage within industry, clinical psychology and indeed genetics scholarship (Jensen, 2000).

Galton overlaid his statistical and scientific inquiry with a series of value judgements about the human condition and the nature of social progress. These reflected then-dominant cultural assumptions about the human superiority of white, upper-caste men; late-Victorian ideas central to the retention of empire through military and economic means.

Galton's values were informed by the system of Christian beliefs, although he took a utilitarian view of religion as that which binds us to duty and moral stability (Gillham, 2001). From an epistemological perspective, therefore, the empirical scientific method of Galtonian eugenics was overlaid by an informal Christian moral epistemology.

Today, the Galton Institute and other features of modern genetic scholarship such as the Galton professorship of genetics at University College London, speak to a strong commitment amongst leading scholars in the field of genetics to Galton's place in the science pantheon. Indeed, that The Galton Institute's previous name, The Eugenics Society, changed only in the 1990s, reflects the fact that for its first 40 years or so, eugenics and the study of genetics were essentially interchangeable terms (Mazumdar, 1992).

In the three decades after Galton's death, Eugenics became an orthodox perspective across the political spectrum. In the UK, Galton's scholarly work was continued by his protégé, the biostatistician Karl Pearson. Pearson argued:

"My view, and I think it may be called the scientific view of a nation, is that of an organized whole, kept up to a high pitch of internal efficiency by insuring that its numbers are substantially recruited from the better stocks, and kept up to a high pitch of external efficiency by contest, chiefly by way of war with inferior races." (Pearson, 1901)

Pearson was a socialist (Semmel, 1958) and remains an econometrician of historical note (Read, 2016). Liberal reformers such as Marie Stopes routinely saw eugenics as a logical way of gradationally improving the lot of the least well-off. The Eugenics Society was established to this end and included Winston Churchill amongst its members (Mazumdar, 1992). In 1942, the eugenicist and architect of the UK welfare state, William Beveridge, promoted to the London Eugenics Society of which he was a member the merits of his child benefit proposals on the basis of their eugenic function (Sewell, 2009, pp73-34). This was at a time when the Nazi eugenics programme was well-known in the UK.

Mazumdar (1992) argues that Edwardian and inter-war support for eugenics was driven by a classical 19th century educated middle-classes' fear of pauperism described by authors such as Charles Dickens. This was reflected in 19th century reform legislation such as the 1834 Poor Law and in the Victorian emphasis upon improving educational provision for the masses.

Stone (2001) allies this notion to the middle classes' fear of losing control over the lower orders as labour became increasingly organised. Poverty's conversion, via eugenics, from

an amorphous social problem into a fixable, biological one therefore gave eugenics the appearance of being driven primarily by ideas about the merits and demerits of given social classes.

However, Stone argues that ideas about the application of eugenics to the domestic social classes required deep assumptions about the ethnic make-up of that population. Here, eugenics in Edwardian and inter-war England was steeped in racial assumptions such as the need to protect white English stock against the threats represented by immigration and miscegenation (Stone, 2001).

By this conception, the oft-assumed distinction between English hereditarianism and the German racial hygiene it informed may be more accurately considered a matter of social and political nuance. Indeed, Stone argues that this narrative was largely the post-war creation of geneticists seeking to preserve the influence of genetics in the wake of the holocaust (Stone, 2001).

In the United States, the ideas of Galton and other English eugenicists were adapted into a context of pre-existing thinking about race in the tradition of Samuel Morton (Kohlman, 2015) and the American School of Enthography (Kohlman, 2018). Eugenics became synonymous with healthy living, seen in the creation of popular “better baby” contests at fairs across the country (Stern, 2002). As in the UK, while scientific epistemology and scientists themselves were fundamental to the creation of eugenics, the system was popularised by professionals whose role was to interpret and work towards social progress.

“Many of the leaders in the eugenic movement were influential social scientists as well as educators, administrators and public health officials. From the natural sciences, such as evolutionary biology and genetics, to social sciences such as anthropology, psychology and sociology, to curriculum and educational policy eugenics was based on melding of a broad range of fields whose harmonious combination was seen as leading to scientifically-based societal efficiency and progress and the evolution of the ‘Overman’ (Bobbitt, 1909)” (Kohlman, 2018, p.12).

Eugenicists in the United States were more successful than their English counterparts in achieving legislative outcomes. Indiana enacted the first legislation in 1907, permitting eugenic sterilisation. The 1924 Immigration Act prevented entry to the US by southern

Europeans on the eugenic basis that such immigrants brought with them a greater preponderance of feeble-mindedness and insanity (Lombardo, 2001).

The 1927 US Supreme Court ‘Buck v Bell’ case established the constitutional validity of sterilisation for the feeble-minded and in the following 5 years 8300 ‘feeble-minded’ people were sterilised in Virginia alone. By 1942, 13 states had passed legislation allowing for the sterilisation of criminals. Lombardo (2001) notes that 33 states had statutes under which more than 60,000 Americans were involuntarily sterilized.

The 1924 Immigration Act and Buck v Bell strongly influenced Germany’s 1935 Nuremburg Laws on racial hygiene (Scales-Trent, 2001). US geneticists shared papers with German colleagues and encouraged the latter’s uptake of eugenic principles. Integral to this was the 1927 US Rockefeller Foundation-funded creation of the Kaiser Wilhelm Institute of Anthropology (Gausemeier, 2010). Its successive directors, geneticists Eugen Fischer and Otman Freiherr Von Verschuer, with leading geneticist colleagues Fritz Lentz and Erwin Bauer, produced the key “racial hygiene” texts which both introduced Adolf Hitler to the idea then underpinned the 1935 eugenics legislation (Schmul, 2008). They supervised sterilisation programmes and all joined the Nazi Party. After the war, they continued their careers in Germany as respected scientists.

In Germany, 340,000 people were forcibly sterilised by German doctors; over half of all doctors joined the Nazi party (Haque et al, 2012) and many of those very early. The eugenic principles underpinning the Nuremburg laws led to the Jewish Holocaust and the extermination of other population groups, where many members of the medical and scientific professions played key roles in planning and, literally, execution (Cohen, 2010; Caplan, 2012; Steger, 2016).

2.3.2 After the Holocaust

Following the Holocaust and World War Two, eugenics’ association with the German regime saw the field universally condemned. The field of genetics suffered through its close association to the point of amounting to the same thing. The United Nations approved The Convention on the Prevention and Punishment of the Crime of Genocide

(United Nations, 1948) outlawed as genocide the killing, harming and otherwise targeting of racial, national or religious groups.

In 1950, The United Nations Education, Scientific and Cultural Organisation (UNESCO) approved a statement on The Race Question. The purpose was to make a strong international moral and scientific statement against the assumptions of racial difference which underpinned the Holocaust. There was a subsequent iteration of the statement the following year and again in 1967 and 1978. The first statement took a social constructionist position on race; the second returned race to biological understanding of race (Brattain, 2007).

The 1978 statement “Declaration on race and racial prejudice” includes the strong statement of scientific principle:

“Any theory which involves the claim that racial or ethnic groups are inherently superior or inferior, thus implying that some would be entitled to dominate or eliminate others, presumed to be inferior, or which bases value judgments on racial differentiation, has no scientific foundation and is contrary to the moral and ethical principles of humanity” (UNESCO, 1978).

The 1950 and 1951 iterations reflected a battle between empirical scientific method and what would become known as social constructionism (Berger and Luckmann, 1966) which is at the root of eugenics and edugenics today.

Brattain (2007) notes that the 1950 statement was drafted primarily by sociologists such as Morris Ginsberg and Ashley Montagu, and influenced by the ethnologist Claude Levi-Strauss. Social constructionism was to the fore. There were many dissenting scientific voices, however.

The second statement, more strongly influenced by scientists, returned to the notion of biological racial categories but issued a strong moral statement of intolerance towards racial discrimination. Brattain notes that there was consensus that the Holocaust had *“made the refutation of racism ‘a legitimate intellectual stance’”* but also that; *“What actually seems to have replaced scientific racism was a stalemate over what had become the default assumption, or null hypothesis, about racial differences”* (Brattain, 2007).

Scholarly and public discourse around issues of race and eugenics was framed in the immediate post-war years by The Holocaust. Over the following two decades, however, segregation in the United States and apartheid in South Africa lent a new political imperative to the principle of racial equality. Education was at the core of this discourse.

The US Supreme Court's 1954 *Brown v Board of Education* ruling, the first in a long series of emancipatory rulings under Chief Justice Earl Warren (Belknap & Warren, 2005), led eventually to the formal racial de-segregation of US schools, although informal segregation still persists there (Hanushek et al, 2009).

The Johnson administration's 1965 Immigration Act (Keely, 1979) was designed to amend the eugenics-influenced cultural bias of the 1924 Immigration Act. The US Head Start programme, which began in 1964, was aimed at low-income families and because of the over-representation of black children came specifically to address black children's educational underperformance (Zigler & Styfco, 2010). The 1960s US Civil Rights struggle led, in due course, to the 1968 extension of the 1964 Civil Rights Act and the end of the Jim Crow laws (Klarman, 2006); the Act was passed during the riots which immediately followed the assassination of Dr Martin Luther King.

When, in the face of Martin Luther King's assassination and the riots which followed, by far the world's most powerful nation sought to build racial equality into legislation and executive action, Jensen's; 'How much can we boost IQ and scholastic achievement?' (1969) provided a real-time riposte from behavioural genetics;

"It is well known that children's IQs, by school age, are correlated with the socioeconomic status of their parents.this relationship between SES (Social and Economic Status, author's italics) and IQ constitutes one of the most substantial and least disputed facts in psychology and education (Jensen, 1969, p.75).....negroes test about 1 standard deviation (15 IQ points) below the average of the white population....the discrepancy in their average performance cannot be completely or directly attributed to discrimination or inequalities in education. It seems not unreasonable, in view of the fact that intelligence variation has a large genetic component, to hypothesize that genetic factors may play a part in this picture. But such an hypothesis is an anathema to many social scientists. The idea that the lower average intelligence and scholastic performance of Negroes could involve not only environmental, but also genetic, factors has indeed been strongly denounced (e.g. Pettigrew, 1964). But it has been neither contradicted nor distorted by evidence (Jensen, 1969, p.82).

Social and educational programmes such as Head Start, argued Jensen at length, would not be effective in closing social and racial educational performance gaps because deprived children on average have lower IQs than their non-deprived peers. Black children are over-represented in this former group because they are on average less intelligent than white. Regardless of the role of the environment, it is likely that genetic heredity causes black people to be on average less intelligent and have poorer life outcomes than white; at very best there is no scientific evidence that the significant black-white intelligence gap is caused by environment alone.

Jensen's views were considered mainstream by many within his scholarly field and, it will be discussed below, are central to edugenics today. He refined his ideas and published on the subject for decades (Jensen, 1998; Rushton, 1998). Most recently, with "Educability and group Differences" (Jensen, 2012), he continued to seek to refine and employ Spearman's 'g' factor to theorise IQ variation, and therefore educability variation, between racial groupings and social classes.

In 2015, Robert Plomin explained his "*softly, softly*" approach to the subject of racial IQ variation by pointing out what happened to his colleague Jensen when he; "*just mentioned race*" (Al Khalili, 10.20). In fact, Jensen's 1969 paper was over 100 pages long and discussed claimed racial group IQ variation extensively.

Rose (1976) argued that Jensenism represented the latest iteration of a scientific racism which ran from Galton in spirit and Spearman in scholarship. This is discussed in detail at Chapter Four. Below, this thesis will propose a new latest iteration in the form of Scientific Racism 2.0.

2.3.3 Jensenism, The Bell Curve, The Mainstream Science on Intelligence (MSI) statement

'Jensenism', as it came to be known, has the potential to undermine assumptions about environmental effect which underpin the political allocation of public resources upon social policy. From a political perspective, this theory supports the notion that social expenditure targeted on the least well off is often inefficient because poverty reflects low

IQ and it is the latter which largely determines life outcomes. This theory potentially entirely re-frames discourse around social policy expenditure.

Social expenditure is justified politically and supported publicly on the basis of what is often today known as equity. Here, applying the principles of fairness and impartiality requires everyone to be given an equal chance to succeed (Gorard & Smith, 2004; Simon et al, 2007). This operationalises as targeting resources at groups who suffer environmental disadvantage and where this disadvantage leads to poorer outcomes.

In education, the principle of equity is rooted in the idea of the level playing field. Students should in theory have the same chances to take advantage of their own talents and should not be hampered or helped by their different environmental conditions, the argument runs.

If it can be shown that unequal collective social and racial outcomes can be explained in full or part by heritable variation in general intelligence, or IQ, the argument for targeted expenditure on environmental factors, such as poverty, may be weakened because such groups of children are not being hampered so much by their environmental conditions after all. Rather, they are at least in part hampered by IQ heritability.

Jensen's scholarship led to public controversy (Banks, 1995), and reflected the continued uneasy relationship on the matter of race between geneticists and social scientists observable within the UN's 1950/51 "The Race Question" statements. Jensen and his work were marginalised by many academy members (NY Times, 2012).

A generation later, Herrnstein and Murray (1994) drew heavily on Jensen's scholarship in their book *The Bell Curve* to make similar broad arguments about intelligence, social outcomes, social expenditure, social IQ hierarchy and race.

For Herrnstein and Murray a cognitive elite sits atop society, an underclass beneath, with society broadly organised around intelligence and associated phenotypic traits. These traits are a function of both environment and heredity. Poor people and by extension black people are on average less intelligent than the better-off and white and this helps explain racially unequal social outcomes (Herrnstein and Murray, 1994).

Much public and scholarly comment, both critical and supportive, followed publication of *The Bell Curve* (Murray, 1994 [1995 edition]; Sternberg, 1995). For example, Fischer et al (1996) argued that Herrnstein and Murray incorrectly weighted variables to arrive at an overestimation of the effect of IQ and an underestimation of the effect of education. They also argued that caste impacted upon IQ results and that race was implicit within caste. Extensive criticisms around statistical techniques and social intentions were levelled at the authors (Fraser, 2008).

In reply, a large group of eminent psychologists and Intelligence scholars published the “Mainstream Science on Intelligence” statement in support of the data and main assumptions made by Herrnstein and Murray (Gottfredson, 1994). Its key message was that variation in social outcomes was in large part a function of the fact that:

"The bell curve for whites is centered roughly around IQ 100; the bell curve for American blacks roughly around 85; and those for different subgroups of Hispanics roughly midway between those for whites and blacks. The evidence is less definitive for exactly where above IQ 100 the bell curves for Jews and Asians are centered. ...Heritability estimates range from 0.4 to 0.8, indicating genetics plays a bigger role than environment in creating IQ differences".

In respect of those scholars who had generated and supported the statement, Schlinger (2003) writes:

*"The list of co-signers reads like a Who's Who of those theorists (e.g. Thomas J Bouchard, Jr, John B Carroll Raymond B Cattell, Hans Eysenck, Linda Gottfredson, Seymour Itzkoff, Arthur Jensen, **Robert Plomin** [author's bold], J Phillip Rushton and Vincent Sarich) who have continued Spearman's tradition of factor analysing intelligence test scores to generate a theory of general intelligence – g – and some of whom (e.g. Thomas J Bouchard, **Robert Plomin** [author's bold]) believe that behaviour genetic research supports the conclusion that 'g' is highly heritable"* (footnote 1, p.16).

There was extensive comment upon the Mainstream Science statement itself, both supportive and antagonistic (Armour-Thomas et al, 2003; Harrington, 1997; Graves and Johnson, 1995). Some critics attacked the methodology or assumptions of signatories, while others were opposed to using science in a way which appeared to give succour to extremist groups motivated by race hatred.

These signatories, who included figures of historical note in the discipline of psychology and a dozen key scholars from the field of Intelligence in particular, emphasised that their assertions on race and intelligence were central to, and justified by, the theory upon which their scholarship was built. None of them, as far as this author can ascertain, subsequently retracted their position or explained how their later theoretical assumptions and methodology have or had been altered as a consequence.

Rather, some doubled down on the race and IQ issue and have since published continuously in this vein (Jensen, 1998, 2012; Jensen and Rushton, 2005; Rushton and Jensen, 2010; Rushton, 2012; Gottfriedson, 2007; 2012; Lynn et al, 2002; Lynn, 2006; Lynn and Mikk, 2007; Lynn and Meisenberg, 2010; Lynn and Meisenberg, 2019).

Meanwhile, others exited the topic of race, or at least stopped mentioning it, and instead focussed their factorial analysis and wider scholarly theory in areas they felt would be more useful. These included addressing late-in-life cognitive degeneration, child development (Kaufmann, 2004, 2009, Kaufmann et al, 2012; Lichtenberger and Kaufmann, 2012) and learning difficulties (Walker and Plomin, 2005; Haworth and Plomin, 2010; Asbury and Plomin, 2013; von Stumm et al, 2019; Malanchini et al, 2019).

The American Psychology Association (APA) formed a commission to study the statement and the wider discourse around The Bell Curve. A report, “Intelligence: Knowns and Unknowns” (Neisser et al, 1996), was produced. The report discussed different conceptions of intelligence but in the context of a psychometric approach supported most of the key aspects of the statement. This included the claimed one standard deviation (15 IQ point) gap between average black and white performance on IQ tests, the cross-cultural validity of such tests and the predictive validity of ‘g’ in respect of educational achievement and other social outcomes.

‘Knowns and Unknowns’, however, stated that while no environmental causes for black-white group variation had been evidenced;

“There is even less empirical support for a genetic interpretation. In short, no adequate explanation of the differential between the IQ means of Blacks and Whites is presently available”.

The APA report in effect laid down an orthodoxy which exists today. To be clear, this orthodoxy is that an average black-white IQ gap exists which has predictive and explanatory power in respect of many life outcomes, including educational achievement; and that IQ is highly heritable within groups but there is no evidence that this is true in respect of the variation between them.

Since then, a battle line has ostensibly developed between those hereditarian scholars such as Plomin supporting the ‘Mainstream Science’ position that a black-white IQ gap is likely a function of both environment and genetics, and those who say it is likely a function of the environment alone. Both sides agree there is no definitive proof either way (Nisbett et al, 2012; Dickens and Flynn, 2001).

2.3.4 Features of hereditarian vs anti-hereditarian discourse

This discourse has a number of particularly notable features.

First, the hereditarian claim that likely both environment and genetics cause an average black-white IQ gap includes an implicit claim that each alone causes an effect, not that they work as a cause only in conjunction with each other. In other words, the claim includes the notion that were environmental conditions equal, black people would still on average have lower IQs than white and this would still affect life and education outcomes.

Second, an argument sometimes used to sweep the whole question aside is that race is widely agreed today as a social construction, so the notion of a black-white difference is rendered meaningless. However, scholars of all stripes routinely use the racial categories black and white today on the basis that these social constructions have research meaning and value. Meanwhile, hereditarians say they accept the socially constructed nature of race (Plomin, 2018).

Third, anti-hereditarians sometimes employ the argument that there are conceptions of intelligence which do not rely upon psychometrics, ‘g’ and factorial analysis. This, in effect, restates the position of the APA ‘Knows and Unknowns’ statement and is reflected in scholarly work such as Gardener’s (1992). Yet while hereditarians tend to contest the usefulness of other conceptions of intelligence, they say their argument rests upon the

correlational and predictive validity of ‘g’ and not upon a refutation of the idea that other ways of understanding intelligence may be theoretically possible.

In the context of this thesis, many anti-hereditarians themselves employ ‘g’ and tend not to commit a performative error by, at the same time, claiming it is invalid.

Fourth, anti-hereditarians hypothesise that various environmental factors create the black-white IQ gap, yet they generally oppose research which may prove their case. This is explored below as the Plomin Dilemma.

Fifth, hereditarians say they do not argue that evidence exists for a genetic causation of a black-white intelligence gap, but that this is the most likely explanation and will in due course be discovered through molecular research. Conversely, anti-hereditarians do not claim that evidence exists which shows the gap to be wholly a function of the environment. This is also developed below.

Sixth, and linked to the fifth, the hereditarian position is today almost invariably referred to by its opponents as pseudoscience. Yet anti-hereditarians often accept the scholarly credentials and output of hereditarians, notably Plomin’s in the context of this thesis. As will be explored in below, this claim appears to be highly selectively applied and is often ignored by some anti-hereditarians where it is inconvenient.

Finally, some apparently anti-hereditarian writers, explored below at scientific racism 2.0, appear to accept all or virtually all of the hereditarian argument about racial IQ variation and social outcomes. Their opposition to the hereditarian position, it is argued below, may be more a function of gamesmanship than reflecting a true anti-hereditarian position.

2.4 Edugenics over-reach

Today, then, there is considerable literature around the subject of factor-analysing IQ test results to generate a theory of intelligence, ‘g’, in the Spearman tradition (Schlinger, 2003); studying human variation using twins studies; analysing SNPs at the molecular level via GWASs to create predictive polygenic scores; using these scores to predict

educability and educational propensity; and seeking to make use of these scores a matter of public education policy.

Some scholars recognise the possible utility of polygenic scores, but downplay present predictive power at the level of the individual:

“Our results suggest that while polygenic scores can be informative for identifying group level differences, they currently have limited use for accurately predicting individual educational performance or for personalised education” (Morris et al, 2020).

Others raise regulatory and ethical questions (Martschenko et al, 2019):

“When should genetic data be used? What regulations should be put in place? These are challenging questions that demand informed engagement. How we as researchers engage with these new developments to proactively combat the use of genetically informed research for racist, classist, or inequitable purposes will be of the utmost importance” (p.9).

Some recognise the predictive power and perhaps future value but are cautious about the speed, and even the possibility, of progress:

At the present time, the predictive power of the polygenic score is clearly too weak to have “clinical” value, and we are sceptical that even increased predictive power would make the score useful as the basis for intervention.... it is becoming increasingly clear that just as biology plays a role in shaping social outcomes, such as education, the social environments in which humans are placed play a role in shaping their biology” (Domingue et al, 2015, p.10-11).

In the same vein, Belsky et al (2016) note that while some degree of genetic prediction for education exists, it is far from being of applicable to policy. The policy action they suggest is regulatory oversight of the ethics of the use of genomic information in education:

At present, genetic prediction of educational outcomes and life success in general is far from sensitive or specific enough to recommend any translational application. Although there is movement toward improving the predictive power of polygenic scores through increased GWAS sample sizes and improved genomic measurements, a precision medicine-type approach to human capital development remains well out of reach. And yet debate is already under way about the possibility for genetic testing to someday be used in forecasting human potential. Policy action may be needed to regulate the ethical use of genomic information in school admissions and tracking decisions, and such actions should be informed by realistic estimates of the magnitude of genetic effects (p.970).

Other scholars, however, are gung-ho. Their confidence that policy application of behavioural genetics research is ahoy is often striking. Strong assumptions are made without evidence in the text, and carefully constructed language is used to push the envelope. This latter group constitutes core edugenics scholarship.

For example, Smith-Woolley et al (2019) are not burdened by the scholarly doubt Belsky et al express about progress on prediction:

“As GPS prediction improves thanks to the increasing sample sizes of GWA studies and methodological advances, GPS will become more powerful for prediction of education-related measures” (p.1159).

von Stumm et al (2020) cut to the chase and argue, through the freighted language of open and closed doors, that their work should lead to learning personalised through genetics:

“It is our hope that our results and others like them can serve to open doors for individual children, not close them, by stimulating the development and provision of personalized environments that can appropriately enhance, supplement, and remediate educational achievement” (von Stumm, 2020, p.7).

Krapohl et al (2018) stress that prediction capacity is moving fast. They refer to scope for very early educational interventions and suggest that “even pre-natal” applications may bring benefits which overcome “concerns”.

“Eventually, MPS models could be useful in both society and science to estimate genetic potential as well as risk in relation to all domains of functioning, including cognitive abilities and disabilities, personality and health and illness. This predictive power will raise concerns about potential early, even prenatal, prediction. It is important to begin discussions that are informed by the empirical data because genotype-based trait prediction is moving towards the point of practical relevance. Although concerns are warranted, these might be outweighed by the benefits that could result from being able to predict problems and potential early and develop stratified preventions and interventions accordingly” (p.1373)

Selzam et al (2017) insist their work has no necessary policy implications:

The finding that individuals’ polygenic scores for years of education predict educational achievement entails no necessary policy implications. However, our findings corroborate that individual differences in educational achievement are partly due to DNA differences between children and are not solely created by environmental forces. By creating a dialogue between scientists and policymakers, the introduction of polygenic scores may soon become a useful tool for early prediction and prevention of educational problems and for personalized learning” (p.271).

Gaysina (2016) explains what would “most likely” be a much more cost-effective way of educating children than at present:

“By considering DNA differences among people in the future, educational genomics could provide the basis for a more personalised approach to education. This would most likely be a much more effective way of educating pupils because educational genomics could enable schools to accommodate a variety of different learning styles – both well-worn and modern – suited to the individual needs of the learner”.

Krapohl et al (2014) foray into comment about the nature of public discourse about teaching, while noting a; “trend towards personalized learning” and employing value-laden “once size fits all” language:

“genetic thinking counters the deplorable tendency to blame teachers and parents rather than recognizing that learning is inherently more difficult for some children and that differences in children’s educational achievement are more a matter of genes than schools or home environments. At the practical level of curricula, the active genotype–environment correlation model of education adds support for the trend in education toward personalized learning. This trend toward personalized learning has become more practical with rapid advances in technology and educational software to supplement or supplant one-size-fits-all traditional systems of education” (p.15276).

In a report in the Daily Mirror newspaper, Rousewell (2014) quotes Professor Robert Plomin of Kings College, London as follows:

“Genetic thinking counters the deplorable tendency to blame teachers and parents rather than recognising learning is inherently more difficult for some children and differences in children’s educational achievement are more a matter of genes than schools or home environments. This trend toward personalised learning has become more practical with rapid advances in technology and educational software to supplement or supplant one-size-fits-all traditional systems of education”.

This quotation bears a close resemblance to the one from Krapohl et al directly above it because Plomin is co-author of that paper as with many others. Plomin is routinely cited both as one of the world’s leading living psychologists (Best, 2020) and also as one of the most eminent psychologists of the 20th century (Haagbloom, 2002).

Since he left the US in 1994 Plomin has attracted over £30m of funding to his laboratory at Kings College (Kings 1, 2020) from bodies such as the UK Medical Research Council

(UKMRC). He has authored and co-authored almost a thousand scholarly works (Kings 2, 2020) and has recently authored and co-authored two well-received popular books summing up his scholarly research for a wider readership (Asbury and Plomin, 2013; Plomin, 2018). He has been cited for a huge range of papers over 34,000 times in the last 5 years, with an annual upward trend, and over 110,000 times in his career (Google Scholar, 2020).

Plomin works commercially alongside Stephen Hsu, arguably the best-known US proponent of the use of genetic prediction in embryo selection (Hsu, 2014). They have collaborated with the Chinese state in joint venture company BGI (Shanks, 2013; Hayden, 2013; Yong, 2013), a private venture ostensibly aimed at determining the genetic basis human of “genius” a` la Francis Galton’s own study of hereditary genius (Galton, 1869). He remains listed as an adviser to BGI (BGI, 2020). The present UK government has, at the highest level, expressed considerable interest in Plomin’s edugenics work and that of BGI (Ahmed, 2020; Mason and Sample, 2020; Cummings; 2019; Merrick, 2013;).

Plomin is a signatory to the Mainstream Science on Intelligence statement (Gottfredson, 1995) which noted that on average black people have significantly lower IQs than white, that this helps explain poorer social and educational outcomes, and that it is likely to be in part a function of heredity and genetics. He has confirmed this remain his position in recent years and says that he avoids the issue of race today because it is contentious (Wilby, 2014; Al Khalili, 2015), because there is more variation within than between groups and because he does not feel the need to study everything (Harris, 2020a). He has a high media presence (Ahmed, 2020).

There are scholars across the world pursuing the scholarly and commercial possibilities offered by behavioural genetics in the field of education. But Plomin sits at the apex, not least because of his personal scholarly cachet and advocacy, and his preparedness to take risk at or arguably even beyond the leading edge of scholarship. This thesis will suggest below that questions it raises about edugenics are illuminated by Plomin’s scholarship and communications style.

2.5 Discussion

This chapter opened with the idea of new technology, in this case what it being called ‘edugenics’, creating a dual or multi-use risk. Chapter Three will deal with the technologies of mass killing in the first half of the 20th century and note that those scholars who developed the science which made them possible were not seen queuing up to take credit once the killing was over.

In the literature of edugenics it is de rigueur to see it stated that the scholarship itself should be applied in policy but that this has no particular policy implications; that knowledge of each individual’s genetics will simply inform more effective and efficient resource apportionment according to policies set by policymakers.

For example, Selzam et al (2017,p.271) write; *“The finding that individuals’ polygenic scores for years of education predict educational achievement entails no necessary policy implications”*, then go on to speculate about the value of application; *“the introduction of polygenic scores may soon become a useful tool for early prediction and prevention of educational problems and for personalized learning”*.

Robert Plomin’s most recent popular book, *Blueprint* (2008), contains a number of examples of a near identically worded caveat:

“No specific policy implications necessarily follow from finding that inherited DNA differences are by far the most important sources of difference in individual school achievement and that schools make so little difference” (p.88).

“no specific policies necessarily follow from genetic findings, because policies depend on values. My values, not my science, lead me away from meritocracy towards a just society” (p.105).

References in such literature to social policy and political science are strikingly absent, however. So how is it possible for such scholars to make any kind of assessment about whether or not particular policies “flow from” their findings.

It will be shown in Chapter Three that in 1945 those Nobel prize winning physicists who worked to develop a German nuclear bomb were aghast, some literally suicidal, when informed that two had actually been used to kill a quarter of a million civilians. Yet from a political science perspective, to paraphrase and slightly misuse Chekov's gun principle, if there is a massive bomb on the table during a world war involving a genocidal regime over here and a power which will fight to the death over there, and a looming battle between allies for post-war supremacy elsewhere, someone's going to get blown up.

If a sociologist with no knowledge of physics announced she was about to step off a cliff but was confident that there were no necessary physical outcomes, scientists may try to explain to her that her ignorance of gravity would not prevent her from plummeting to a speedy death rather than floating skyward.

On this basis, edugenics literature's "*no specific policy implications*" might have come from the mouths of German atomic scientists. It might be said that other people well-placed to judge - Adolf Hitler, Franklin D Roosevelt, Joseph Stalin and Winston Churchill – had a better-informed sense of what the "*policy implications*" of a nuclear weapon programme were.

With social policy and political science literature absent from edugenic literature, there appears to be an authority fallacy in play. Scientific authority extends from the undoubted scientific credentials and methodology of the scientific scholars and scholarship, but this authority cannot be transferred to claims where knowledge of different literature is required. Edugenic literature typically urges policy adoption of its results; but without referring to relevant literature, claims of any sort about policy implications are surely invalid?

A related problem is one of definition. A plan to DNA test all children, regularly IQ test them and design mandatory public education around the results is of course a vast top-level policy in itself.

The authority fallacy leads on to another. Edugenics literature like that above makes broad reference to the educational benefits DNA testing would bring through early intervention. Yet there is no evaluation of the present educational literature on, for example, early

intervention for learning difficulties. Edugenics in effect calls for vast upheaval in educational provision yet provides no educational argument for change.

What exactly, for example, do Krapohl et al (2018) mean by; “*early, even pre-natal*” prediction? Is it a reference to embryo selection and selective abortion? Or does it imply scope for educational intervention in learning difficulties earlier than it takes place at the moment? Yet in the latter case, many children begin pre-school at the age of 3 when teachers take note of early signs of difficulties. Reading difficulties, which often have other educational implications, are noted when children begin to read at school around the age of 5. In other words interventions already take place early. Specifics about the benefits of even earlier intervention should therefore be bread and butter to edugenics scholars since this is supposed to be its central function. Yet the literature is silent on the matter. This is particularly striking since it is hard to imagine what form an intervention before the ages of three to five might take.

None of these weaknesses are necessarily fatal to edugenics. It is possible that in future evidence will emerge to serve edugenics ends in due course. Perhaps medical diagnosis of particular disorders will render edugenics useful in this medicalised context, although such a context brings its own social dangers. For now, however, all of this is unknown and edugenics literature is much the weaker for not acknowledging its scholarly limitations.

A larger lacuna appears to exist in edugenics literature, however.

Because of word limits, some orthodox and uncontroversial positions on the nature of policy formulation are taken as axiomatic in the 5 paragraphs following.

Social policy today is constructed around an assumption that the primary levers open to policymakers are environmental; that the main drivers of societal progress come variously in forms such as economic growth, poverty alleviation, equal opportunities and child rearing choices made by parents. Policymakers decide how and where best to raise, apportion and deploy available resources in order to adjust environments for intended outcomes. The general principle of fairness underpins the broad contract between policymakers and public.

There is much disagreement around what constitutes fairness in any specific case and this is reflected in the political discourse. However, rival ideas are inevitably framed by this assumption that social policy is a matter of how social expenditure impacts the environment.

The political right tends towards 'fair' resource-raising, distributive and spending policies which reward natural abilities while creating some form of protection for the least able. The left tends towards the notion that social outcomes do not reflect ability, but instead reflect unfair societal and economic mechanisms. It therefore urges wider, redistributive, expenditure targeted upon improving outcomes for the least well off.

In each, case, however, the notion of equity plays a central part. Equity is a slippery concept, particularly in respect of its precise relationship with equality, but the educational concept of equity - that socially disadvantaged children should be provided with additional resources to give them a crack of the whip equal to that of their better-off peers - is as much a principle of the right as of the left. Indeed, the idea of enabling natural talent to flourish wherever it appears underpins economic capitalism.

Meanwhile, much of the left, perhaps excluding neo-Marxists, does not on the whole dispute that there should be variation in outcomes. Instead, it argues broadly that outcome variation should not be as great as it presently is and that each child should have an equal chance to achieve the outcomes his or her abilities permit.

The application of genetics to social policy turns this 'environmental' assumption underpinning public policy upon its head. To the extent the environmental effect of unequal social outcomes is reduced, so the idea of equity would need to be adjusted to account for 'unfair' distribution of natural talents. This would precipitate an epochal shift in the philosophical basis of social expenditure in general and education expenditure in particular.

The edugenics response to this is to argue that this philosophical upending could lead to expenditure turning around the compensation of people born less able. Plomin criticises meritocracy for deceptively presenting unearned natural ability as a function of hard work;

he implies that society need not be structured so that the more able, however we may define that, have greater power and better life outcomes.

“meritocracy sounds like an irresistibly good idea, both parts of the neologism ‘meritocracy’ are loaded with unpalatable connotations. The noun ‘merit’ refers to ability and effort but it also connotes value and worth. It is derived from the Latin word meritum meaning ‘worthy of praise’. The ‘ocracy’ part of ‘meritocracy’ refers to power and governance. Putting these two components of meritocracy together with genetics implies that we are governed by a genetic elite whose status is justified by their ability and effort. Instead, it could be argued that people who got lucky by drawing a good genetic hand do not merit anything. Their luck at learning easily and getting satisfying jobs is its own reward. And who says we should be governed by genetic elites? (P.92-93)

In Harris (2020a), however, Plomin restates this but also suggests that people might be best to choose learning programmes which reflects what he calls their own “*appetites*”; this seems in the use a simple euphemism for aptitude. If getting satisfying jobs should be its own reward, as he says, then his anti-meritocratic notions appear to imply that society should not be structured to reward those with an “*appetite*” for brain surgery over those lucky few who have one for toilet cleaning. At face value, this is literally a revolutionary idea.

Plomin says his politics are of the centre-left (Wilby, 2014). He offers a critique of meritocracy and social injustice consistent with Michael Young, the writer who coined the term; he is a co-author with Young’s son, Toby (Smith Woolley et al, 2018). But like edugenics as a whole, Plomin offers no argument or evidence as to how or why a radical reduction in ‘environmental’ expenditure could reasonably lead to the anti-meritocratic policy ideas he says he lauds.

Such a valid scholarly argument could of course only extend from literature of political science and social policy, which is absent in the edugenics literature. It takes only the most superficial considerations of what Plomin’s aspirational outcome would look like in practice to suggest that the search for plausibility would be challenging at the very least.

Affirmative action on the basis of social disadvantage, for example, is often resisted in practice; for example across the United States during the 1960s civil right legislation. The notion that people would be prepared to accept affirmative action on the basis of some notion of genetic injustice is hard to understand. A new public conception of injustice

would certainly be required. And the ideas that it might be desirable to remove any correlation between IQ and social success, and that policy levers might be available to do this in any case, seems to border on the absurd. Could universities be compelled to stress lower intelligence and ability in their entrance criteria? Would people accept others being promoted above them not in spite of being less intelligent or otherwise less able but specifically because of it?

Meanwhile, Charles Murray, one of the authors of *The Bell Curve* (Herrnstein and Murray, 1994) and a self-described “*Madison Republican*” (Harris, 2017) presents the alternative prospectus. He is a sophisticated and experienced political analyst and author of the right who is unafraid to court controversy (Murray, 2020; Sehgal, 2020; Murray and Phillips, 1990; Murray and Field, 2001; Prideaux, 2010). His present appointment as holder of the FA Hayek chair in Cultural Studies at the right of centre American Enterprise Institute (AEI, 2020) reflects his credentials as a scholar of social policy in the Hayekian tradition.

Murray’s conservative policy imperatives, reduced welfare expenditure and lower taxes, flow coherently from the views (Murray and Herrnstein, 1994) about heredity and the function of IQ in educational and wider social outcomes he shares with Plomin (Plomin, 2018). It is not necessary to agree with his argument in order to understand why a radically reduced emphasis upon the social effects of the environment lends itself to Murray’s conservative and social prescriptions (Murray, 2020).

The claim from edugenics, therefore, that the science would lead to no particular policy imperatives, looks decidedly shaky. It will be argued below that in fact this is the kind of magical thinking design to conceal some controversial features of edugenics.

Scientism, in Hayek’s terms, is the inappropriate application of scientific method within non-scientific fields. It reflects an epistemological confusion on the part of some scientific scholars and creates significant yet unexamined risk for edugenics.

The common scholarly lineage of eugenics and edugenics is instructive in this respect. It is often argued (Rust and Golombok, 2014; Goldstein, 2012) that Galton’s statistical work was of great historical significance, while his ideas about eugenics were nonsense (Gillham, 2001). But edugenics scholarship today does not rest upon the nonsense. Galton

is celebrated by geneticists because his statistical insights led to Spearman and onwards to 21st century scholarly orthodoxy in the field of intelligence theory. Asked in July 2020 who he would choose if he; *“could resurrect one person and put them in the world today”*, Robert Plomin replied with Francis Galton (Harris, 2020b, 6:40). This is the scholarship and approach which underpins edugenics theory.

This scholarship has led Plomin and a large number of other eminent scholars in his field to insist that much social inequality reflects IQ variation, that black people on average have lower IQs than white and that this is likely influenced by genetic inheritance.

Here, the heritability and behaviourist theory which edugenics rests upon crashes into social constructions extending from non-scientific epistemologies.

It is in theory perfectly possible for a scientific theory to be recognised as empirically correct but also be racist or deterministic. Indeed, the APA and most psychologists today accept the idea that racial inequality can in large part be explained by black people on average having lower IQs than white. This is manifestly a racist proposition to many people, regardless of the effect or non-effect of genetics, because racism is constructed by those who see and experience it.

While much literature criticises this hereditarian thinking, (Gillborn, 2015; Turkheimer, 2016; Turkheimer et al, 2017; Comfort, 2018), the behaviourist genetics research underpinning edugenics is not unorthodox. It is conducted by often eminent scientists and employs conventional and recognised techniques of scholarship. There seems at least a chance, and perhaps much better than that, that the claimed scientific application of genetic prediction to education and other fields is a fast approaching possibility. But edugenics literature is limited to scientific method; it cannot at present legitimately deal with problems of social policy which require the lenses of different epistemologies without lapsing into scientism.

Data appears neutral, although as Kuhn and Lakatos argued it is theory impregnated. It is characteristic of edugenics scholarship that it advocates for its own application as social policy. It seems from this that edugenics scholarship must extend beyond its present scientific epistemological boundaries to include other ways of knowing or accept that its

application could or would lead to outcomes society may deplore. Using one example, that of racism, Chapter Four below examines how edugenics scholarship seeks to evade its own serious epistemological and ethical problems.

Chapter Three: Critical Theory and Critical Race Theory

3.1 Critical Theory (CT)

The school of social and philosophical thought which would become known as Critical Theory emerged during the second half of Germany's interbellum Weimar Republic. Initially, it followed Max Horkheimer's tacit programme for the Frankfurt Institute of Social Research, of which he was appointed director in 1930. The rise of the Nazi Party displaced the institute first to Switzerland in 1933, then to the United States in 1934 as an adjunct of New York's Columbia University (Abromeit, 2011; Berenzden, 2017).

Frankfurt School scholars such as Horkheimer (Horkheimer, 1972), Theodore Adorno (Horkheimer and Adorno, 1972 [1944]), Erich Fromm (2011 [1941]) and Herbert Marcuse (Marcuse, 2007), developed Critical Theory as a means of critiquing contemporary society (Landmann, 2011).

After World War Two, the Frankfurt Institute returned to Frankfurt but the Frankfurt School became a metonym covering those associated scholars who returned to Germany, those who remained in the US, and a second generation of scholars who revised Critical Theory in the light of their own post-war critique of Critical Theory itself.

The birth of Critical Theory amongst Jewish Marxist scholars in Nazi Germany reflected the historical times (Jacobs and Jacobs, 2015). The adoption by Germans of fascism over Marxist revolution, the perceived embracing by some German scientists of hard positivism and military-industrial research imperatives, the rejection of liberal Weimar values by the same; each contributed to an intellectual context which ostensibly set scientists led by an analytical framework informed by logical positivism against anti-positivists led by the imperative of human emancipation (Heller and Ritter, 1978).

Between 1919 and 1933, Germany's constitution and governance conformed largely to the requirement of the Treaty of Versailles. The abdication of Kaiser Wilhelm made Germany a de facto republic and the first meeting of the assembly which agreed the new constitutional convention took place in the town of Weimar. The period was, and remains, known informally as the Weimar Republic.

Unlike the US-funded Marshall Plan for the economic regeneration of Germany and Western Europe which followed World War Two, the Treaty of Versailles which followed the end of the Great War laid punitive reparation costs upon Germany. This severely constrained that country's economy and drove extensive internal poverty. The collapse of exports, the low permitted level of imports and hyperinflation combined with low agricultural productivity led to near starvation for many Germans (Hansen and Debus, 2012; McElligot, 2009).

In this climate, the unstable administration came under continuous pressure from both right and left. The former bred on the humiliation and desperation felt by many Germans, although national socialism was an admixture of fascist and socialist ideas; the latter sought the overthrow of the capitalism they saw at the root of the nation's problems.

From 1919 until 1924 social and economic conditions worsened for most Germans, from the already low base of wartime need. From 1924 to 1929, there was a modest easing of the challenging economic conditions faced by most Germans. The Dawes Plan saw US lenders enable Germany to mortgage capital assets within Germany to help pay annual reparations agreed at Versailles (Ritschl, 2013). This short period of relative improvement in conditions for Germans has been called; "The Golden Era". This epithet refers not just to the modestly improved economic conditions, but more significantly to the liberal and artistic developments of the late few Weimar years (McElligot, 2009; Weiner, 1991; Phelan, 1985). This period in effect ended with the collapse of the New York Stock Exchange in October 1929, which in turn precipitated the worldwide Great Depression and led to the withdrawal from Germany of the US lines of credit.

The cultural liberalisation of parts of increasingly polarised Weimar Germany and the relative strength of the political left and centre-left was at that time juxtaposed with the growing in prominence of the far right. Yet in the 1928 general election, the Nazi party commanded only 2.5% of the suffrage (Hawes, 2017; Hansen and Debus, 2012). Months after the beginning of the depression, however, it had become the largest party in Germany. By Spring 1933, Hitler was Chancellor and had suspended the constitution through The Enabling Act of that year. This signalled the end of the Weimar period and the beginning of a Nazi dictatorship given legitimacy through a landslide general election

victory. This in turn led to the flight from Germany of Jewish and Marxist intellectuals such as the Frankfurt School scholars.

The creation of The Frankfurt Institute for Social Research in 1923 as an adjunct of Goethe University had represented an effort by some Marxist scholars, in the wake of the failed German revolution of 1919, to understand the reasons for that failure and to consider the preconditions for the success of Marxist prescriptions. During the second half of the Weimar period, when a relatively strong political left gave hope that some form of Marxist programme could still find practical application, it had followed the broad template of Marxist economics.

By 1930, in the wake of wholesale economic collapse and fast-growing fascism, then from 1933 onwards in the school's new form, Horkheimer and others concluded that a new social and philosophical critique was required to rescue those Marxist tenets which had not been controverted by German experience. Why had Marx been wrong about revolution in industrialised societies? How had enlightenment values led to fascism? How to combat fascism and apply potentially rescue-able features of Marxism? Marxism was not abandoned by the Frankfurt School at this stage but was instead critiqued and synthesised with new intellectual influences.

This new critique was rooted in Kant's transcendental idealism (Allison, 2004), Hegel's dialectical discourse (Adorno, 1993), a near-wholesale rejection of enlightenment rationality and a critique of hard 'logical' positivism. The former elevated the role of human understanding of external stimuli, with space and time operating as notional mechanisms through which we understand the appearance of empirically measurable things. This stood in opposition to the idea from realism that empirical measurable things have existence independent from how they are formed in the real world by humans (Moore, 1903); it sought to synthesise the role of empirical and philosophical inquiry, with the former informing the latter and thereby enabling higher understanding.

Here, historical process and the transitional context of an object played a central role. The meaning of empirically measurable things extends from their historical context and their location in cycles of changing existence. A chair, say, formerly part of a tree and in future

returned to the wood's constituent parts, is given existential meaning by humans who place its present empirical existence into its cyclic context.

Crucially, however, the Frankfurt scholars followed Marx's revision of Hegelianism in the form of dialectical materialism. This reflected the Young, or New, Hegelian tradition of rejecting Hegel's conservative emphasis upon the past, present and the status quo, and introduced the idea that the forces of production and society create the underlying human consciousness, which in turn produce the possibility of future revolutionary change.

The Frankfurt scholars considered that Marx had overplayed the effects of economic theory alone. He had, they argued (Horkheimer, 1937), underplayed individual human psychology and failed to account for its role in collective human behaviour. Marx had not foreseen the way capitalism would control how individuals in industrialised societies would become conditioned to see their powers of agency in terms which ensured the conservation of the capitalist status quo. He did not account for human psychologies conditioned primarily for individualism rather than collective action; concerned with relative material progress rather than revolutionary overhaul.

For the Frankfurt school, class consciousness lay at the heart of how individuals operate in society and constrained emancipation; the conditions in industrialised societies did not lend themselves to revolution as Marx had supposed.

Instead, they theorised, a society's dominant ideology normalises and frames people's understanding of their lived-in world. This includes the way scientists categorise and describe empirically observable phenomena. At the core of Critical Theory was the analysis of those often-unexpressed assumptions built into the infrastructure of human understanding.

Critical Theory's purpose was emancipatory. It stressed the functional importance within theory of explanation, practicality and normativity. In this way, and as distinct from what the Frankfurt scholars referred to as traditional sociology, critical analysis was developed for the purpose of creating new normative behaviour and structures; of going beyond analysis to address injustice and propose new structures and processes of human organisation (Bohman, 2019).

Horkheimer (1937) critiqued traditional enlightenment theory, such as Descartes', as suffering from a failure by materialists, or positivists, to "recognise that the economic (and thus currently capitalist) structure of society shapes scientific work" (Berendzen, 2017).

Foreman (1971) has argued that the development, at exactly the same time as the early Frankfurt School, by Heisenberg and others of Bors' and Planck's quantum theory was in part driven by the intellectual free-thinking made possible by their rejection of what they saw as alien Weimar culture values imposed by the First World War victors. Here, although some such scientists may have eschewed the broader political platform of the right, they nevertheless validated and even led its scientific narrative. This came to be reflected in the reliance of such scholars upon the industrial, then overtly military industrial, sponsors (Foreman; 1974) as they worked to further the ends of the Nazi-run state.

While anti-positivist social scientists hostile to the rise of the Nazi Party, often Jews, were driven from Germany, many scientists who ostensibly reflected the positivism of The Vienna Circle and embraced military-industrial interests became integral to Germany's military industrial, eugenic, genocidal then nuclear programmes. Many scientists (Weigmann, 2001), and half of Germany's doctors (Kater, 1989) joined the Nazi Party, the latter by far the highest professional group represented amongst the membership. Their scientific and medical expertise became essential to the design and execution of the German eugenics programme, the Aktion T-4 Project which executed large numbers people considered mentally defective, then the systematic extermination of millions of Jews, Romany, and other minorities deemed genetically undesirable or inferior (Wikler and Barondess, 1993).

Indeed, while in the 1930s eugenics became official German state policy then served as the philosophical underpinning for genocide, it was a notion given scientific form by doctors and scientists though 1920s Rassenhygiene [Racial Hygiene] ideas; Hitler took them up as a scientific principle championed enthusiastically to him by doctors and scientists. Stein (1988, p.50) notes: "*Nazi racial and biological policy grew out of a well-established and generally accepted scientific tradition*". Gallagher (1990, p.191) writes: "*the Nazi*

administration was as close as the world has come to being a medical state: a government run in accordance with 'doctor's orders'".

Meanwhile, the views and actions of other scientists under Nazi rule were more complex, sometimes perhaps seeking to protect German science and scientists from Nazi excesses. For example, Cassidy (2010, Foreword) writes of Heisenberg:

"The second significant event of the Twentieth Century entailed the world's first encounter with industrialised totalitarianism and genocidal dictatorships, the Nazi dictatorship in particular. How did this happen, and in Germany of all places, the leading cultural and industrial nation at that time? As a member of the non-Nazi upper academic stratum of German society, the product of the best culture and education that Germany could offer, Heisenberg provides a valuable insight into these questions as he, and many others like him, encountered and eventually found accommodation with the new regime. This raises a host of further questions. What events of their past informed their response to the regime, and why did their efforts at opposition fail? How could Heisenberg remain in Germany and lend his prestige to that society as one of its prominent remaining scientists? How could he become a representative to occupied nations? How could he work on nuclear fission, and potentially an atomic bomb, for such a regime at war"?

Heisenberg led the German attempts to weaponise nuclear fission and build a nuclear bomb, but also helped persuade the German government to accept by 1942 that the project was not feasible. After the war, he was appointed Director of the Max Planck Institute. This renamed Kaiser Wilhelm Institute had previously been run by the originator of quantum theory Nobel laureate Max Planck and funded by US Rockefeller money. In the 1920s it had been pivotal in the development of American Eugenics into the form applied by Nazi Germany (Gausemeier, 2010).

Some scholars detect a clear chain of reasoning which connects the 1920s logical positivists to post-war pragmatists and post-positivists such as Willard Quine and Karl Popper (Misak, 2016). This was reflected in the personal positions of the key scientists themselves. Moreover, the quantum theorists had through analytical logic, in a near paradox, reached the novel scientific conclusion that an objective position upon a physical phenomenon was not possible. This lent itself to the post-war intellectual emphasis upon subjectivity, which in turn brought non-scientific methodologies into scientific discourse.

Post-war, Heisenberg (1971, p.213) distanced himself from positivism:

“The positivists have a simple solution: the world must be divided into that which we can say clearly and the rest, which we had better pass over in silence. But can anyone conceive of a more pointless philosophy, seeing that what we can say clearly amounts to next to nothing? If we omitted all that is unclear we would probably be left with completely uninteresting and trivial tautologies”.

While it is true that many medical scientists and biologists knowingly facilitated the Nazi German regime’s eugenic and genocidal programmes, it seems that physicists such as Heisenberg and Planck objected to, but felt themselves as elite scientists somehow above, the Nazi politics of the day. In the early years they believed Nazi populism was a flash in the pan, and as time passed they believed they could somehow influence policy for the better.

Personal failings; arrogance, ambition and in Planck’s case simply old age, combined to lead them to suppress their deeper fears about the likely destination of the application of their own science as national policy (Cassidy, 2010). Heisenberg’s historically significant 1941 meeting in Copenhagen with his former mentor Niels Bohr, another after the war in 1947 and their exchange of letter in the 1950s (Niels Bohr Archive, 2002) have become key exhibits in discourse around science, ethics and morality.

These exchanges reflected the wider post-war imperative, after the horrors of a genocide which had extended from decontextualized scientific ‘truth’, of the search for pragmatic ways of synthesising the empirical and what would soon become known as the socially constructed. The possibilities presented by the new atomic age were immense. It was clear to scholars that this potential for human progress would need to be managed through a new consensus on the nature of the relationship between scientific method and other epistemologies.

The German experience, in this way, sits at the core of critical theory. Why were hard-pressed Germans attracted to fascism rather than Marxism? Why had many scientists ignored the implications of other epistemologies in the application of their scientific method to such terrible ends? What did it mean for the positivist epistemology underpinning science and medicine that most German doctors had joined the Nazi Party? How do empirical facts operate in conjunction with historical patterns of meaning? How do we account for the influence upon empirical knowledge at any one time of visible and

invisible influences, such as who is funding research, and why? How do power relationships and social stratification affect the ways humans make sense of empirical facts? How do we create categories through which we understand and operationalise empirical knowledge?

Post war, Horkheimer and Adorno believed that 1920s state intervention had overcome the problem of production being alienated from the producers, yet they could see that this had led on not to emancipation but to fascism. They maintained their attack on positivism and enlightenment reasoning. They theorised (Horkheimer and Adorno; 1944, 1947) that capitalist societies industrialised culture and created pseudo political and consumerist choices which acted to prevent emancipation in a similar way to dictatorship. Marcuse (1965, 1966), who had stayed in the US, developed this idea into the notion of educational dictatorship in the 1960s and became a touchstone for participants in the 1960s protest era (Kastiafacas, 1996). His notion of supposed tolerance as a mechanism of oppression on university campuses remains influential today (Sculos and Walsh, 2018).

Yet while the Critical Theorists stressed the employment of empirical scientific method alongside the study of the social context and its historical development, Berendzen (2017) argues that their interest in scientific theory was limited to stressing its importance rather than laying out exactly how its relationship with social science should work. This is important, since without a properly thought through place for empirical science, critical theory risked becoming a post-modern device of deconstruction alone.

In the post-war context of the search for a new and effective synthesis of scientific method and other epistemologies, Jurgen Habermas (1981a, 1981b, 1991) critiqued Critical Theory itself and concluded that Horkheimer and Adorno had been wrong to reject enlightenment reasoning outright.

It was true, he theorised, that a form of enlightenment rationality had led to the Holocaust. And because opposing views can be supported by equally valid reasoning, conclusions can precede their supporting arguments with a contest between equally valid arguments won not through reason but, as with the Nazis, through force. Here the victor is unchallenged in the field of reason and, with the post-enlightenment passing of religion and in the absence of any other transcendent idea, is beyond challenge altogether.

Habermas parsed the idea of enlightenment reasoning and proposed that the rationality to which Critical Theory heretofore referred was in fact “instrumental”. That is, the kind of logical reasoning which creates the means to an end. Instrumental reasoning follows logically in pursuit of a particular outcome. It is self-contained and sub-transcendental, whether it is a group of friends erecting a marquee or German scientists building a genocide machine.

This dominance of instrumental rationality gave rise, for Habermas, to strategic rationality, where arguments were pitted against each other not for reasons of finding or agreeing a higher truth or best solution but in the tactical or strategic interests of the employer of the argument. The seed of strategic rationality was planted in the enlightenment itself, he argued. The rejection of the authority of the religion was replaced by rationality, but rational discourse became progressively strategic as the public domain became more complex. Open face-to-face discourse gave way to the construction and delivery of arguments through ever-growing media. Commercial, industrial and financial imperatives led to small ‘p’ and large ‘P’ political discourse where arguments reflected vested group interest. Public discourse became characterised by proxy arguments, often distilled into simplistic rhetoric, where the public were able to make choices only within the frameworks constructed by the elites who packaged them up.

Habermas’ solution was communicative rationality (Habermas; 1981a, 1981b). Empirical facts and non-empirical reasoning and constructions acquire meaning through human perceivers; communication is therefore an essential part of the meaning-making process. Communication must be authentic. Participants must ensure that what they say is true, right, honest and normative. They must be open to valid argument and prepared to accept a superior argument in the search for new normative behaviours (Geuss, 2011).

Communicative rationality was informed by the US liberal pragmatism of vO Quine (1976 [1951]) and the post-positivism of Popper (1959). It appears to offer the rescue of enlightenment rationality and the synthesising of scientific and other knowledge in common pursuit of best social outcomes. These best outcomes, in practical terms, are of course framed by their capitalistic context. They provide scope for a pragmatic, gradational improvement in respect of wider social justice. It might be seen as a kind of Fabianism.

Scholars such as Harvey and Reed (1991) criticise Habermas for throwing the Marxist baby out with the bathwater. Kompridis (2011) criticises him for collapsing Critical Theory into the sphere of liberal theories of justice, essentially as a mechanism for agreeing the rules for settling moral and political questions and rejecting the action-based tenets of Marxism. In other words, Habermas creates a new utility for Critical Theory but in the reduced context of achieving iterative improvements in a capitalist system.

These points might be viewed as observations rather than criticisms. Habermas' purpose is to rescue Critical Theory as an emancipatory system with practical effects in the world. This was Critical Theory's original purpose as conceived by Horkheimer et al, working at a time when Marxism had failed to take hold in Germany and fascism was instead in the ascendant. Marxism did not have a great time in post-war Stalinist Soviet Union either. By the time Habermas formulated his theory of communicative action, the great regime most closely associated with Marxism had imploded.

For the purposes of this thesis, in any case, it is a moot point whether Habermas' conception of Critical Theory leads to a rejection of emancipation in favour of a kind of soothing balm, or indeed whether his criteria for "communicative rationality" is practicable. Instead, the purpose is to illustrate the post-Holocaust demand and scope for a pragmatic synthesis of empirical scientific method with non-empirical epistemologies in order to arrive at conceptual meaning and meaningful social progress.

3.2 Critical Race Theory (CRT)

The 1960s onwards, saw the deconstruction of social and subject-area problems across the spectrum of social studies. Habermas fiercely resisted the relativism of postmodernism. At a technical level, he criticised postmodern scholars such as Derrida and Foucault for performative errors which required the use of the rationality their own intellectual paradigms rejected (Aylesworth, 2008). On the larger tapestry, postmodernism appeared to threaten deconstruction without any scope for reconstruction or application. This was a risk which has faced unrevised Critical Theory as it failed to fully respect scientific method and to produce workable proposals for progress. Again, it is moot whether Habermas was

identifying genuine flaws in the earlier work of Horkheimer and Adorno et al or simply urging the greater accommodation of capitalism.

Postmodernist conceptions of critical theory have nevertheless become commonplace and often influential over the last half century. These have sometimes morphed into new critical approaches. In this way, as the field of Critical Legal Studies widened and inevitably created internal intellectual tensions between competing imperatives, some scholars wished to maintain a focus upon race. The result was the emergence of Critical Race Theory (CRT).

CRT extends from a number of ostensibly simple axioms. These include that racism is endemic in modern society and institutions, and not simply the aberrant behaviour of some individuals; intersectionality is important in how it operates on people of colour, but the focus on race must not suffer from the liberal tendency to risk dilution by creating ever-more protected categories with equivalence to race; individual experience and voice have an essential role in challenging dominant societal narratives.

Gillborn (2016) writes:

“Despite its name, CRT is not so much a theory as a perspective. That is, CRT does not offer a finished and exclusive set of propositions that claim to explain precisely current situations and predict what will occur under a certain set of conditions in the future; rather it is a set of interrelated beliefs about the significance of race/racism and how it operates in contemporary society (p.92)”.

Citing Carabado’s (2011) emphasis upon establishing boundaries, and therefore definition, for CRT Dixon and Rousseau Anderson (2016) include a number of characteristics:

CRT, the authors say, challenges the notion of continuous progress, or “linear uplift”, in the history of race relations; repudiates the idea that present social arrangements are the result of accumulated merit; challenges the principles of colourblindness and colour consciousness; argues that race is socially constructed; examines structural racism and view racism as endemic; recognises intersectionality; is both ideological and pragmatic (p.34). It can manifest in a number of ways; through counternarrative in order to disrupt received orthodox narratives as a first-hand account or as an analytical tool.

Gilborn (2016) adds that CRT;

“crosses epistemological boundaries.....critiques civil rights law as fundamentally limited... critique(s) liberalism; claims of neutrality; objectivity; colourblindness and meritocracy as camouflages...challenges ahistoricism and recognises experiential knowledge of people of colour” (p.97).

Here, conceptual tools include storytelling, interest convergence and critical studies of whiteness. Ladson Billings and Tate (2016) place the intersection of CRT and Education in the context of society’s emphasis upon property rights; as a prism through which to examine educational iniquity through legislation and policy instruments (p.14).

For example, Gillborn et al (2017) illustrate how, over the last generation, policy execution has, to the detriment of black children, interacted with educational provision in England to continuously “move the goalposts” of normative secondary school benchmarking.

Over that period, governments regularly moved the attainment targets for 16 years olds. As black children almost caught up gradationally with white children against the new targets, the targets were increased and the earlier disparity was re-embedded.

“whenever the key benchmark for achievement has been redefined, it has had the effect of restoring historic levels of race inequity; in essence, policy interventions to ‘raise the bar’ by toughening the benchmark have actively widened gaps and served to maintain Black disadvantage”(abstract).

Did policymakers regard the predictable negative effect upon black children as a fair price to pay for being seen to toughen standards? Or was the matter never given standing in the policy discussion either because of ignorance or choices made by advisers within the civil service?

Gillborn (2016) writes:

“At the beginning of this paper we posed a simple question; what has happened to the Black/White achievement gap over the last quarter of a century? Our analysis has shown that the ways in which the gap is measured by policymakers plays a crucial role in maintaining race inequity, despite a pattern of rising achievement over time”.

This is the epitome of structural racial injustice in Education, exposed and given clarity through the prism of CRT. The critical argument views the reported empirical facts from the race perspective of CRT to arrive at a different conclusion from present policymakers. This in turn reflects the synthesis of epistemologies proposed by the later Frankfurt School (Habermas, 1981, 1991; Honneth, 1996)

This thesis focuses upon theories around human variation and how they impact black people. In the example explored by Gillborn, where children have improved life outcomes because of higher standards of education per se then higher standards on average help all children. But a significant reason for linking higher standards of mandatory education to life outcomes relates to competition. Where children compete for subsequent courses and jobs on the basis of qualifications, through mechanisms like examinations at age 16, success is a function of performance variation. In other words, regardless of how high standards become, much social benefit will remain locked into performance variation. Where that variation is consistently racial, therefore, this variation also locks in racial inequality.

Official rhetoric invariably stresses levelling-up; mechanisms which purport to attempt to close black/white disparities are proposed (Harding, 2019). But the historical and contemporary evidence of entrenched racial disparity remains. A simple question exposes why:

Which is more important, higher standards or racial equality?

This question transcends the matter of how standards might be measured, whether through formal examination results, the quality of undergraduate essays or through laying the scientific discoveries which improve the lot of humankind. Against this is pitched the simple principle of racial equality.

A policymaker may evade the horns of the dilemma and say that we should aim for both. But by not addressing the racial dimension of educational outcome variation through structural changes, and indeed by sometimes actually making it worse as Gillborn et al illustrate, policy of this nature literally stresses higher standards over racial equality.

Another example may be seen in elite university access. In the UK, black Caribbean students are well under-represented at so-called elite universities. Some colleges of Cambridge University did not admit any black Caribbean students over a period of several years (Quinn, 2018). Some such universities, including Cambridge, have taken action in recent years to increase black-Caribbean intake figures. But when challenged on why significant disparities still exist, even when variables such as entry qualifications are controlled for, they invariably cite process causations such as the courses black people apply for and the schools they attend for mandatory education (Boliver, 2014).

Asked about black Caribbean under-representation, Cambridge University argued that it could not solve the problem by itself, said it was achieving gradational improvement by doing what it could internally and blamed external factors (Busby, 2018). But of course any university can solve the problem by itself by adopting affirmative action. The Cambridge position therefore implicitly rejects affirmative action and prioritises the principle of higher standards over racial equality.

A CRT perspective therefore commends the following answer to the question asked above: Racial equality is more important than higher standards. If it is never accepted as such, then racial disparity is a permanent feature of all policy and institutions.

At chapter four, CRT serves to contextualise a critique of aspects of edugenics. It is not necessary, however, to accept the perspective in order to understand or validate the critique.

3.3 Discussion

The development of Critical Theory (CT) took place as a response to fascism fuelled, and at times actually directed, by the notion that societal progress could be facilitated by scientific method alone. Habermas' revision came in the context of a world negotiating new epistemologies which would enable practical social and scientific progress while avoiding the German horrors. Critical Race Theory came about following the US civil rights period. It has roots in critical theory but also has a debt to the postmodernism Habermas was determined to avoid.

This is all a drop in the ocean of post-WW2 philosophical, scientific and applied social thought which led to a vast array of epistemologies and approaches. This section has barely mentioned post-positivism, pragmatism and post-modernism, for example. In effect, singling out CT and CRT is more or less arbitrary. Indeed, Critical Race Theory (CRT) may itself be said to be an ambiguous collection of philosophical and practical ideas, some of them mutually contradictory.

But the purpose here is to explore how the need for new epistemological approach to science arose, during the lives of millions of people alive today, to place scientism into historical and epistemological context. CT is apt because of its emphasis upon the cyclical nature of history, and because the trajectory of its own development mirrors that of scientism. In addition CT in the Habermas tradition seeks to find practical ways ahead which avoid the relativism of postmodernism. A feature of this approach is to stress the practical reconstructing and creation of solutions, rather than accepting CT as primarily a postmodern mechanism of deconstruction.

At face value, it is hard to find anyone who disagrees with the idea that societies must employ a range of epistemologies when making decisions about science and technology with profound implications for their members. This is evident across fields of scholarship including genetics.

And yet, as the last chapter showed, today's edugenics literature extends from positivistic scientific method alone. Where mainstream genetics intersects with areas attracting serious societal oversight, such as with embryo selection and human genetic engineering, there is evidence of as much scholarly and public concern and thought as with any other potential medical therapy yielded by the rapidly advancing field of human genetics (Brokowski, 2018; Joseph, 2017; Kaplan et al, 2015; Dondorp et al, 2013;). But this evidence is not present in the edugenics literature itself.

Where this intersection does not apply, therefore, notably in respect of proposals to design personalised general education around DNA testing, edugenics literature is wholly a function of claimed scientific methodology. There are occasional references to the need for society to give wider moral and practical thought to the science before implementing, but edugenics literature does not actually extend to reviewing such literature. Rather, on the

basis of scientific method alone it insists that educational policy should, or inevitably will, accept a central role for personal genetic information. It shows no awareness of any other epistemological perspective.

Were this a marginal area of scholarship with little social significance, this contemporary manifestation of scientism may not be a significant public concern. But as laid out in the previous chapter, the field has attracted considerable interest at the highest level of government and it is likely that products based claiming to take advantage of it will come on to the market very soon.

The 1941 Heisenberg-Bohr meeting in Copenhagen is instructive in this respect. It seems likely that Heisenberg was at the very least hoping Bohr could be persuaded to help the faltering German atomic bomb project in some way. Even allowing for the veiled talk required at that meeting Bohr, one of the great scientific minds of the century taking about his own speciality within physics just four years before Hiroshima, believed it was virtually impossible that fission could ever produce a weapon. Heisenberg, another of the great scientific minds of the century, may have thought it possible but certainly felt this point was some way off in the future. Indeed, when he learned of Hiroshima and Nagasaki he did not believe it was possible and assumed it was a ruse.

Operation Epsilon was the British holding, between VE and VJ Days, of the ten key German atomic scientists in a bugged country house (Cassidy, 2017). The official transcript of the moment they were told of Hiroshima reads as follows:

“1. Shortly before dinner on the 6th August I informed Professor HAHN that an announcement had been made by the B.B.C. that an atomic bomb had been dropped. HAHN was completely shattered by the news and said that he felt personally responsible for the deaths of hundreds of thousands of people, as it was his original discovery which had made the bomb possible. He told me that he had originally contemplated suicide when he realized the terrible potentialities of his discovery and he felt that now these had been realized and he was to blame. With the help of considerable alcoholic stimulant he was calmed down and we went down to dinner where he announced the news to the assembled guests.

2. As was to be expected, the announcement was greeted with incredulity. The following is a transcription of the conversation during dinner.

HEISENBERG: I don't believe a word of the whole thing” (GHDI; 1945).

The assemblage of scientific geniuses at Los Alamos and the breathtaking speed of their results were made possible by the determined application of US power and money to a new and fast-moving scientific field. The application of the resulting technology came without public discourse around its morality. There were no philosophers nor social scientists present at Los Alamos to consider the epistemological or philosophical dimensions of the puzzle.

Instead, the development of the atomic bomb as an endeavour of scientific method alone, if not its actual use, was presented retrospectively as justifiable on the basis of being a means of defeating a genocidal regime itself informed by scientism. Only once the bombs had been dropped did the possibility of their future use join the Holocaust as the subjects of the great post-war discourses around science, epistemology, morality and the meaning of societal progress.

While genetics may not so far have yielded the practical benefits predicted at the mapping human genome two decades ago, it is nevertheless a fast-moving field of scientific study whose applications seem potentially prodigious. In the absence of war, the money and determination which led the Los Alamos scientists to near impossibly fast results will come, as capital markets dictate, from investors seeking high returns in innovative areas.

Meanwhile, geneticists stress the need for careful consideration of the societal implications any such new technology may bring with it. Oversight is in considerable evidence, albeit necessarily sometimes ad hoc in view of the fast-moving nature of new technologies like CRISPR. Few scholars are suggesting that we must press on immediately with genetically informed embryo selection or the designing of babies more intelligent or superior in some other way.

A small number do, it is true, argue that the difficulty of world regulation means that some nations will carry on regardless (Devlin, 2019). This lowest common denominator argument is present in edugenics (Hsu, 2014). Plomin, a collaborator of Hsu's (Specter, 2014) on a project in China, writes:

“Knowing about genetic risk might also become a self-fulfilling prophecy, for example if a child is labelled as at risk for learning disorders. Parents might select embryos (pre-implantation as in in vitro fertilisation) or fetuses (abortion) with fewer genetic risks and more genetic strengths. These are serious problems, but some of the fears derive from misunderstandings about what genetics can and cannot do” (Plomin, 2000).

This thesis argues that the scientistic nature of edugenics literature generates considerable, and so far unexamined, risk. The perspective of CRT is employed as a means of illustrating one manifestation of that risk. The value of CRT in this respect extends less from its overall coherence as theory than from its imperative that epistemologies which impact upon society and public policy must account for structural and pervasive racism. This principle is present in discourse around mainstream medical genetics. As the next chapter will show, it is wholly absent from edugenics scholarship.

Chapter 4: Colourblindness and Scientific Racism

It was suggested at chapter two that edugenics in the application is essentially a dual-use technology; the scholarly basis for designing education around genetic inheritance, and a mechanism of embryo selection for intelligence and other traits deemed desirable by consumers. The historical relationship between edugenics and eugenics has been examined. It has been noted that the modern science of edugenics pushes at scientific boundaries, which is its purpose, but is broadly orthodox in its theoretical assumptions. The leading scholar in the field, Robert Plomin, is a psychologist of both current and historical renown; his laboratory is well-funded and has published extensively on its twins then GWAS work since 1994.

Edugenics literature is characterised not just by its science, but also by its appeal for application in social policy; notably education policy. Yet while its theory is rooted in long standing psychometric, statistical and behaviourist genetics scholarship, it contains little or no reference to literature in the fields of education or political science. This gap seems to account for the strange failure of edugenics scholarship to make any concrete or even useful proposals for educational practice which would justify upending current educational practice. It was also suggested that references to policy in edugenics literature often appears to be made in the context of an authority fallacy.

This chapter will illustrate how this literature gap reflects a deeper epistemological problem. This epistemological weakness may be viewed through a number of prisms. Chapters 2 and 3 juxtaposed the lineage of edugenics with that of critical race theory. In this chapter, edugenics is considered through the prism of race and two particular phenomena are explored.

4.1 Colour blindness

“Color blindness is rooted in the belief that racial group membership and race-based differences should not be taken into account when decisions are made, impressions are formed, and behaviors are enacted. The logic underlying the belief that color blindness can prevent prejudice and discrimination is straightforward: If people or institutions do not even notice race, then they cannot act in a racially biased manner” (Apfelbaum et al, 2012).

A generation after a World War 2 fought by racially segregated US military units, and while miscegenation and other racist law still fully applied in that country, the aspiration of a colourblind society was central to the US civil rights struggle. The most famous section of Dr Martin Luther King's 1963 speech at the Lincoln Memorial includes: *"I have a dream that my four little children will one day live in a nation where they will not be judged by the color of their skin, but by the content of their character. I have a dream today"* (King, 1999).

King's rhetoric is sometimes used by conservatives to defend the idea that from that point onwards, society should be organised on the basis of a colour blindness which presents affirmative action as anti-white racism (Carbado and Gulati, 2002, pp1173-4 & p.1174 footnote 74; Turner, 1996, p.101). They refer to the equalities legislation which came as a consequence of the actions of members of the civil right movement (Hartman, 2013).

Notably, the Civil Rights act of 1964 outlawed racial segregation in schools, public services and the workplace; the 1965 Voting Act equalised the right to vote by outlawing Southern states' rules on voter registration designed to suppress turnout amongst black people; the 1968 Civil Rights Act outlawed racial discrimination in the renting or selling of houses (Ware, 2012).

But although King did argue for a class-based approach to affirmative action (Haley, 1965), he was manifestly a supporter of affirmative action, such as Executive Order 10925 actioned by the Johnson administration in 1965 and which mandated the targeting of resources at under-represented minorities. Asked in 1965 interview by Alex Haley: *"Do you feel it's fair to request a multibillion-dollar program of preferential treatment for the Negro, or for any other minority group?"*, King replied:

"I do indeed. Can any fair-minded citizen deny that the Negro has been deprived? Few people reflect that for two centuries the Negro was enslaved and robbed of any wages, potential accrued wealth which would have been the legacy of his descendants. All of America's wealth today could not adequately compensate its Negroes for his centuries of exploitation and humiliation" (Haley, 1965, paras 22-24).

The legislation Haley and King were discussing was precisely that which, in the immediate aftermath of King's 1968 assassination, prompted Arthur Jensen to write his real-time

criticism on the basis that black people are on average of lower intelligence than white (Jensen, 1969). This is discussed above at Chapter 2 and is returned to in Chapter 5.

Bonilla-Silva (2017) argues that this modern colour blindness is a reframing device employed to maintain racial discrimination for the post-Jim Crow law era in ways which fit the post-1960s discursive landscape. White people antipathetic to racial equality accepted it was no longer acceptable or effective to argue for black inferiority and adopted “abstract liberalism” with respect to race.

The frame of abstract liberalism involves using ideas associated with political liberalism (e.g., “equal opportunity,” the idea that force should not be used to achieve social policy) and economic liberalism (e.g., choice, individualism) in an abstract manner to explain racial matters. By framing race-related issues in the language of liberalism, whites can appear “reasonable” and even “moral,” while opposing almost all practical approaches to deal with de facto racial inequality” (p.56).

In an empirical study, Knowles et al (2009) distinguish between *distributive* and *procedural* justice. The former runs in the spirit of King’s and the 1960s legislation around colour blindness as an aspiration which can only be realised through targeted expenditure upon disadvantaged racial groups. The latter is a retreat into process by antiegalitarians. The authors study attitudes of white respondents to ideas about racial colour blindness. White egalitarians accept the distributive meaning until they feel their interests may be threatened, for example through affirmative action which may deny their children a university place, then most adopt a procedural interpretation. White anti-egalitarians interpret the concept of colourblindness in procedural terms.

“In Study 1, White people high in egalitarian sentiment were found to shift their construal of color blindness from a distributive to a procedural principle when exposed to intergroup threat. In Studies 2, 3A, and 3B, the authors used manipulations and a measure of threat to show that antiegalitarian White people endorse color blindness to legitimize the racial status quo” (Knowles et al, 2009, p.857).

Johnson (2019) argues that in this way colour blindness has changed over half a century from being a progressive concept designed to legitimise affirmative action in the search for eventual full racial equality, into a conservative device aimed at the opposite. In the US, this has been facilitated by the US Supreme Court’s interpretation of the US constitution:

“As the nation underwent a massive civil-rights transformation from the end of the Civil War to the dawn of the 21st century, color blind constitutionalism evolved from an argument made by racial progressives to one championed by racial conservatives. What

was once a legal framework for justifying the extension of citizenship and rights to oppressed black Americans is now an argument for the unconstitutionality of any measure intended to address the harms caused by the state-sanctioned denial of those rights. In its application today, color-blind means protecting white Americans from the discrimination that some conservatives perceive results from attempts to remediate historical wrongs” (para 3).

At the beginning of his seminal exploration of this issue, *Race Without Racism* (2017), Bonilla Silva writes:

“Whereas Jim Crow racism explained blacks’ social standing as the result of their biological and moral inferiority, color-blind racism avoids such facile arguments. Instead, whites rationalize minorities’ contemporary status as the product of market dynamics, naturally occurring phenomena, and blacks’ imputed cultural limitations” (p.2).

Gillborn (2018) notes how anti-white racism is becoming an increasingly heard complaint as white people grow in confidence:

“Advocates of color-blindness often portray themselves as occupying the moral high ground—that is, as rising above petty racialized disputes in order to see the true worth of people and the arguments they make. In practice, however, color-blindness has become an argument to ignore race inequality and silence critical discussion of racism in all but its most crude and obvious forms”.

He cites Annamma et al (2017), who take an intersectional approach fusing CRT and disability criticism (DisCrit). Extending from Gotanda’s theoretical structure of constitutional colour blindness, they note that from the late 19th century until now the US Supreme Court has upheld the principle of colourblindness. This has in turn laid down the orthodoxy in the public sphere including Education and Research. They propose “colour evasiveness” as an adjusted notion that removes both the possible positive connotations of colour blindness and its unintended disable-ist connotations. In addition, it sharpens the phenomenon to take into account Gotanda’s non-paradox that it is not possible to ignore race unless you have noticed it then performatively, or otherwise, claimed to lay it aside.

It is interesting to note that in Justice Harlan’s influential dissent in *Plessy v Fergusson*, 1896 (Harlan, 1896), which argued for racial equality before the law, the following appears:

“The white race deems itself to be the dominant race in this country. And so it is, in prestige, in achievements, in education, in wealth, and in power. So, I doubt not, it will continue to be for all time, if it remains true to its great heritage and holds fast to the

principles of constitutional liberty. But in the view of the Constitution, in the eye of the law, there is in this country no superior, dominant, ruling class of citizens. There is no caste here. Our Constitution is color-blind and neither knows nor tolerates classes among citizens”.

Harlan, while dissenting from a conservative verdict which upheld racial segregation in service delivery, nevertheless set his original conception of colour blindness into a wider context of perpetual white supremacy. This procedural, or process-based, approach to colour blindness is the dominant judicial and institutional one in the US today.

The same broad phenomenon of colour blindness as colour evasiveness is widely observable across Europe. Hübinette and Andersson (2012) write of colour blindness in Sweden; Clelland and Cashmore (2014) in English sport and Madriga (2018) in English higher education. In Italy, writes Migliarini (2018);

“concealment (of race and racism) processes are based on the general assumption that race does not exist at the biological level. This ideology proposes that because race is unscientific and problematic; it seems best to avoid race’s harmful effects by discounting it or by looking for the cause of discrimination elsewhere, namely in the realm of sentiments such as fear” (pp440-441).

In contemporary institutions, then, colour blindness manifests as a conservative disposition on race aimed at preserving the unequal status quo while maintaining an outward appearance of fairness. When employed commonly by white liberals, it might be described as that point of hypocrisy where altruistic intent is capped by self-interest.

4.2 Edugenics Colour blindness

A form of colour blindness is visible in contemporary behavioural genetic science which explores and promotes the role of genetics in education, or edugenics. This is not because it accounts for race in a colourblind way, but because race is a calculated absence in the research literature.

Edugenics colour blindness is not, in fact, rooted in what Bonilla-Siva describes as a replacement of the *“facile argument”* of biological superiority. Rather, it emerges from the deliberate concealment of precisely that biological argument via an evasion of the ideas of race and racism altogether.

As described in chapter two above, edugenics contains within its own DNA a scholarly position that black people have on average lower IQs than white, that this goes a long way to explaining unequal educational and wider life outcomes, and that this variation between black and white is more likely than not partly a function of genetic inheritance.

To recap, in 1994 a large group of eminent psychologists and intelligence theorists published a joint statement expressing their strong support for a number of scientific propositions in the field of intelligence scholarship. The strength of their support, and feeling, was emphasised by taking the unusual step of publishing not in an academic journal, but in The Wall Street Journal newspaper. The long statement reflected the theory and assumptions upon which their own extensive research was based. It included:

"The bell curve for whites is centered roughly around IQ 100; the bell curve for American blacks roughly around 85; and those for different subgroups of Hispanics roughly midway between those for whites and blacks. The evidence is less definitive for exactly where above IQ 100 the bell curves for Jews and Asians are centered. ...Heritability estimates range from 0.4 to 0.8, indicating genetics plays a bigger role than environment in creating IQ differences" (Gottfredson, 1994).

The signatories worked in the Spearman tradition of factor analysis and 'g'. As noted at Chapter two, the statement reflected the strongly held scientific opinions of senior scholars in the relevant fields. They went to the trouble of making a major public announcement of views they knew would be extremely politically contentious in support of key premises of a highly controversial book. They felt the statement was of great importance because there was much public misunderstanding of crucial aspects of their own scholarly theory.

It should not be at all surprising, therefore, that none later changed their mind about the principles they asserted in the statement. If any had, it could not have been limited to some form of politics-aware apology for causing offence. As scholars they would have had to explain how their theory had to that point been in serious error; they would have had to show the implications for previous results and also how they had substantially modified or abandoned the theories which underpinned their scholarship going forwards. That none felt

the need to reflects the profound importance of the principles in the statement to their own scholarship.

Some of these signatories continued to write about intelligence and race, and some do today. They have often suffered personalised attacks on the various bases that their work is not useful, is faux or that it gives succour to non-scientific racists who misuse the scholarship in popular discourse (Ceci and Williams, 2009; Gottfredson, 2010; Sesardic, 2005).

As noted in chapter two, many scholars employ intelligence theory in the Spearman tradition, notably ‘g’, in the study of cognitive decline and other fields which have scope for practical medical applications. In addition, the same broad theory is applied widely today in the form of psychometric testing across professional fields including clinical psychology, educational psychology and in schools administration. This is not to say that such people have the same view on race and intelligence as the signatories of the mainstream science statement, but rather to note that the signatories’ science extended from orthodox views on race and intelligence within the field of psychology.

Robert Plomin, one of the signatories, moved from the US to establish his present highly successful laboratory at Kings College, London the same year as the statement and its aftermath. He has never mentioned race since, although he has written two highly successful popular books designed to bring the ideas contained in his many highly-cited scholarly papers to a wider public audience. In recent years, he has been asked about his opinions on race and intelligence, as expressed in 1994. One on occasion, Wilby (2014) reported:

“He says he doesn't regret signing. As he wrote in 1996, genes gave him a stubborn nature, while family nurture ‘gave me a strong dose of self-esteem’, allowing him to ‘take the heat’” (Wilby, 2014).

On another occasion (Al-Khalili, 2015), Plomin said:

“race is an extremely tricky issue, I’ve ducked it my whole life....in general I’ve felt ‘softly, softly’, is the better way to go...it’s a distraction to my research, but I think the basic facts are there about heritability of intelligence”.

In July 2020, Plomin said he does not focus upon; *“the politically explosive issue of average differences between (racial) groups”*; *“because I don’t have to”* (Harris, 2020b).

These statements appear unambiguous. A world-leading scholar is asked by journalists about by far the most politically contentious feature of the theory which underpins his life’s work. He explains that his views on race and intelligence are as stated in a statement he made in 1994. This is in common with other signatories working today, such as Professors Richard Lynn and Linda Gottfredson. And it is not surprising, since if they had changed their minds about principles which were so important to their research that they were placed by them into a major newspaper, then they would surely have already published on the matter in order amend the theoretical, and even paradigmatic, basis of their own work.

Unlike Lynn and Gottfredson, however, Plomin explains openly, if rarely, that he avoids the issue of race and intelligence now because his views would get in the way of his highly successful research programme at Kings. Where there may be racial implications arising from his work, he says he proceeds; “softly, softly” or simply ignores the implications. In other words, he protects the progress of his wider research agenda by veiling, or ignoring, that part of his theory which many would consider racist.

Gillborn (2016), who describes Plomin as “hereditarian” and an “educational gene-ist”, notes that this “racial inexplicitness”:

“provides a way in which authors can avoid public condemnation while indirectly advocating a causal biological/evolutionary connection between race and intelligence. Following the public ridicule and disgrace of James Watson this approach has become much more common than the old style direct assault in-the-name-of-scientific-truth that found its peak of popularity in the 1990s (in the work of Rushton, Herrnstein and Murray). Race and racism remain a vital absent presence in this work; the hereditarians have not changed their beliefs about race and the supposed intellectual inferiority of Black people – they simply do not advertise it anymore”.

Tory Duster (2015) describes a phenomenon elsewhere in medical genetics which provides a useful perspective upon Plomin's move here:

"A significant wing of the Biological Sciences has found an unusual and effective way around the problem of confronting the matter of 'race as a biological category'. The strategy is to not deal with race in a full-scale case-control design, but to 'back into' a clinical study that was never designed to test whether race plays any role, only to discover ex post facto that the race of the clinical population, however defined, played a role in drug efficacy" (p.12) .

Plomin and his colleagues do not control for inter-racial IQ variation when they analyse GWASs for SNP and polygenic function. But at the same time, their theory includes an assumption that there is likely to be a genetic causation for much of the racial variation geneticists of all stripes say is observable through IQ testing. They then propose the application of their results to public policy. They know that if they are correct about a genetic causation of inter-racial IQ variation, this will come out in the post-application results analysis. In the way Duster describes, Plomin et al will have incidentally 'backed race' into a study which was ostensibly colourblind.

'Backing into' goes to the heart of Plomin's *"softly, softly"* (Gillborn, 2016) strategy. He believes there is a genetic component to inter-racial IQ variation but there is little utility for him, and indeed much hazard, in openly researching the matter. So he does not control for race believing it will come out as a by-product of post-application statistical analysis and he will not be the one to do that. This is the essence of edugenics colour blindness. It is an attempt to evade the charge of scientific racism, discussed in the next section.

As noted above, England's mandatory education system is already racialised at the margins through the use of IQ testing to select for grammar schools. Grammar schools are themselves a contentious matter since they symbolise a particular vision of education usually linked with the political right. The racial disadvantage they create has been tolerated by successive governments.

This leads to the Plomin Dilemma, discussed at more length below. Namely, if Plomin et al are *correct* about a genetic causation of racial IQ variation, then the use of DNA testing to introduce polygenic prediction into education provision would risk vastly multiplying the racial effect currently observable in the very small grammar school system; both in local effect within each school and across the whole country. Regular IQ testing would

supplement DNA testing and together this would result in the existence of strong racial patterns within the resultant personalised learning programmes edugenics scholars propose.

While if Plomin et al are *incorrect* about the genetic causation of racial IQ variation, this would expose an error inherent deep within their theory which, unamended and unexplained, would make it impossible to justify policy informed by it.

Either way, this risk is presently unexposed and Plomin explicitly says he evades it because of its contentiousness. Referring back to the Overton window for practicable policy mentioned in Chapter two, for policymakers the notion that edugenics would or even could, according to its own theory, lead to the advance racialisation of education provision across England would surely place the application of genetic research to education outside the realm of possible policy application? This risk is what edugenics colourblindness is designed to evade, at least perhaps until the application of genetics to education has taken place and has become the new status quo; Duster's "*back(ing) into*".

4.3 Scientific Racism

This thesis does not lay down a definition of racism or scientific racism. A full exploration of the problem of definition would require a thesis in itself. Instead, scientific racism is treated here as a frequently used pejorative; a charge laid by some scholars against some lines of inquiry which explore the relationship between race and intelligence. The researchers who follow such lines are often described as racists themselves, or otherwise criticised in personalised terms. Such work is often described as "pseudoscientific" (Paludi and Haley, 2014; Cofnas, 2020).

This section makes some contextual remarks about how scientific racism is described in the literature the next argues that an attempt by some geneticists to deal with the problem of scientific racism both fails as a coherent argument and amounts to a refinement of the notion it seeks to criticise.

A typical scholarly definition of scientific racism may be found at The Encyclopedia of Critical Psychology (Paludi and Haley, 2014), which begins:

“Scientific racism describes ways researchers have justified inequalities between races by relying upon pseudoscience, i.e., methodologically flawed science. Scientific racism is an ideology based on the spurious assumption that biological race exists (Winston, 2004)”.

This formulation, which extends from a publication of the American Psychological Association (Winston, 2004), has a number of striking features. First, the phrase; “*ways researchers have justified inequalities*”, appears calculatedly ambiguous. Is it intended to mean that researchers have claimed there are empirically measurable inequalities of, say, IQ between races? Or to mean that researchers have sought to use such claims to justify social inequalities? The use of “*justify*” rather than “*explain*”, “*spurious*”, and “*ideology*” appears to invite the latter interpretation. Yet if this meaning is taken, it excludes scholars to whom the first meaning would apply, like Plomin. These scholars think it likely there is a genetic explanation for inter-racial IQ variation and indeed that this explains much social inequality, but Plomin for one is explicit in saying he wishes to use his scholarship not as a justification for inequality but a means of addressing it (Plomin, 2018).

The definition makes two other claims. The first is that biological race does not exist. This presents as settled something which is still much-contested within the disciplines of psychology and genetics. The 1994 mainstream science statement is unambiguously a claim of a biological basis; the 1996 APA response does not take a final position on the matter and there is no record that the APA position has changed in this respect. These constitute a paradigm or part thereof. It is not possible rationally to overturn this model simply by saying it isn’t so.

The second claim is that scientific racism by definition includes a biological claim. But, as will be argued below, it is a contradiction fallacy to argue both that race and racism are social constructs and also that a scientific criterion must apply. Social constructions need not be evidenced, or even true.

The rest of Paludi and Haley’s extensive, APA-sourced, definition treats scientific racism as a corollary of pre-World War Two eugenics and erroneous science. It says that eugenics

was pseudoscience rooted in ideology and that there was a parting of the way between geneticists and eugenicists at the end of the war. This narrative from modern psychology and genetics, pre-WW2 genetics and scientific racism as erroneous science with genetics since then shorn of the risk of scientific racism, is noted by Stone (2001) above and is discussed below.

It is a matter of orthodoxy, albeit contested, within psychology and genetics that self-defined black people on average score more poorly than white in IQ tests, that such tests are predictive of social and educational outcomes, and that it is possible that there may be a genetic explanation. It is also a matter of orthodoxy that 'g' is not a mathematical artefact but is instead an empirical thing. It follows from an assertion that 'g' is not an artefact that average IQ difference between black and white is in some sense empirical and not socially constructed, even if this does not of itself prove that variation between groups is heritable.

The purpose of such value-laden and apparently calculatedly ambiguous definitions as Paludi and Haley's then, in the wake of these orthodoxies, appears to be to protect scholarly fields such as psychology from the harmful pejorative of scientific racism while keeping virtually all of the old assumptions alive.

This approach is not confined to psychology and genetics. In 1998, following the APA statement of 1996, the American Anthropology Association put out its own statement (AAA, 2020). These two statements are often used as the basis for the charges of pseudoscience made towards hereditarians by some ostensibly anti-hereditarian writers.

There is insufficient room in this thesis for a full analysis of the AAA statement, but it involves little actual science and instead has the appearance of a document aimed at defending a professional field without providing much in the way of substance.

It consists mainly of references to historical norms and the colonialist use of racial categories to subdue and control. It begins shakily by citing what is sometimes now known as will be the Lewontin fallacy (Lewontin, 1976; Edwards, 2003); the notion that biological race cannot exist because there is more variation within so-called races than between them. Its references to "frizzy hair" and "dark skin" look almost quaint from a 2020 perspective, when race is accepted ostensibly by all sides as a social construction.

The paper's arguments may guide an intelligent and human approach to the general subject of race and intelligence, but wide acceptance of the socially constructed nature of race together have served together to by-pass whatever science the hypothesis contained within the statement sought to validate.

Similar to the 1996 APA statement, however, the AAA statement's primary purpose does not seem to be scientific.

Armeligos and Goodman (1998), writing at the same time the statement was made, describe race as; "a core concept in anthropology since its inception" (p.359). In a paper entitled; "the profession of the colourblind", Shanklin (1998) argues that; "anthropology has been a colourblind profession for nearly half a century" (p.669). She goes on to draw attention both to Boas' role in the UN statement on race and tendency within anthropological literature since then to evade the question ever since by taking a colourblind stance.

Rigby (2020 [first published 1997]) writes of the role white US anthropologists played in maintaining race as a biological category. Ingold (2008) argues that the AAA statement is; "*internally inconsistent in the meanings it attributes to both biology and culture*", and unhelpfully embeds the notion of an absolutist battle between the two". Branklin et al (2011) analyse the field through the prism of "*anthropology as a white space*" and note that within anthropology departments and literature; "*'colorblind' racial explanatory practices - discourses that explain away racially unequal institutional practices as being 'not about race' - are common*" (abstract).

In short, the AAA statement on race appears to reflect a political imperative extending from anthropology's failure to that point to fully confront its own past, combined with its desire to remain a relevant 'science'.

To this extent, the statement may be seen best as a progressive wish on the part of many anthropologists to move on from a colourblindness which steadily displaced biological explanations of race. It does not appear, however, to serve in any way as a document of or about scientific method. The biggest absence is an account of when, how and specifically

in what ways eminent anthropologists changed their scientific theories about race, with all the implications this would have had for their life's work.

4.4 Scientific Racism 2.0

Edugenics colourblindness seeks to evade the charge of scientific racism not by actually denying the racially contentious scholarship, but by simply avoiding any reference to race at all. In a distinct but related phenomenon, some ostensibly liberal geneticists seek to defend their broad field of scholarship, human genetics, by condemning long-outmoded scientific ideas while preserving the ones which truly underpin modern scientific racism. This argument is referred to here as Scientific Racism 2.0 (SR2.0) because it refines the very notion it ostensibly seeks to invalidate.

SR2.0 is promoted by geneticists and science journalists not through peer-reviewed scholarly papers but through non-scholarly media such as popular books, blogposts and social media. This means of amplification has been mentioned above in respect of EO Wilson's "consilience" and Robert Plomin's more speculative popular books such as *Blueprint* (Plomin, 2018).

Publishing a popular book or magazine article aimed at the mass market enables scholars to take a holiday from the peer-review crucible while potentially smuggling untested ideas into mass circulation as if they had academic provenance. In this way, difficult questions can be evaded and favoured themes promoted. Reviews by laypeople rather than qualified scholars can be carefully managed and projected to convey the impression that such publications have scientific cachet and are important contributions to the field. The effect of this amplification upon public perception via high sales, newspaper extracts, media interviews and rebroadcasting through social media can be profound.

SR2.0 has informed a BBC series fronted by a geneticist (BBC, 2014a); newspaper articles written by geneticists (Rutherford, 2015) and blogs produced by geneticists (Birney et al, 2019). It is at the core of one of the UK's best-selling non-fiction books of 2020 entitled; "How to argue with a racist" (Rutherford, 2020). The book is essentially the text, with some amendments, of a keynote 2019 lecture by with the same title and by the same author (Rutherford, 2019), widely available on the internet.

Rutherford (2020) provides a fine example of SR2.0 and how it works.

Here, the pre-20th century and early 20th century work of celebrated geneticists, scientists and racists such as Linnaeus, Galton and Pearson are sorted into good and bad; *“we should be capable of recognising and celebrating great scientific achievements while simultaneously condemning bigotry, even when they occur in the same individual”* (pp.143-4). The taxonomic and statistical ideas which have great influence on scholarship today are also celebrated. Long since falsified and racist ideas, such as phrenology and the innate savagery of the African, are set up as an Aunt Sally. Most of the subsequent argument then goes into ridiculing both those falsified ideas and the extremist fringe who support them today.

But this racist fringe is surely characterised by its failure to accept rational scientific argument? So what is the purpose of the book? Meanwhile, the great majority of racism in society extends from people and institutions already ostensibly converted to the cause Rutherford espouses. The notion that contemporary institutional, structural and personal racism can somehow be argued with by producing an argument from genetics not only fails logically and epistemologically, it actually concedes to the racist fringe the framing of the discourse.

Meanwhile, the statistical work for which Galton, Spearman and Pearson are celebrated, and which others have built upon over the years, is discussed as the basis for claims that white people on average have higher IQs than black and that this helps explain unequal social and educational outcomes. This claim is not disputed;

“IQ has been tested and scrutinised for a century in thousands of studies. That alone makes it a useful metric”; “IQ has great value when looking at populations” (p.147).

“The value of IQ for science is undeniable. It also correlates well but not perfectly with other measures of cognitive abilities that are often used in scientific studies, such as educational achievement (results in exams) and duration (how long you stay in education). People who score well in IQ tests tend on average to live longer, get better grades at school, are more successful at work and have a higher income. When it comes to looking at IQ scores around the world and between different populations, the picture is far from clear, but there are some undeniable differences. The most up-to-date meta-analyses suggest that countries in sub-Saharan Africa are likely to score in the 80s, as compared to

*UK IQ standards, though these results are not universally accepted. This, obviously, is significantly lower. Interpreting these results is not easy at all, **and while it is not possible to fully exclude genetic factors, these seem unlikely***” (pp. 149-150, author’s bold).

IQ is described as an effective and valid predictor of educational achievement and other social outcomes; society is structured around IQ. There is great variation between racial groups (although in-country variation is ignored here) and it is not possible to exclude genetic factors.

Average intelligence variation is said to be highly heritable within populations but **not necessarily** between populations;

*“intelligence is highly heritable....but we have a poor understanding of the genetics that underlies cognitive performance...so when we see different IQ scores in different populations, and we know that the heritability of intelligence is high (more than 50 per cent), **that doesn’t mean necessarily that the different DNA variants account for the differences between the populations**”* (p.158, author’s bold).

Rutherford (2019) agrees that in scientific terms we don’t know one way or the other whether there is a genetic influence on inter-population variation;

*“Would it make any difference, if we, as scientists, as honest brokers, did demonstrate that there was a significant biological basis for intelligence or for sporting success that did coincide accurately with folk descriptions of race? If we could do those things, which I think are highly unlikely, **but we don’t know**, I think are highly unlikely, would that mean that we would treat anyone differently?”* (1:08.27, bold reflects verbal emphasis in lecture).

An extensive blogpost co-authored by geneticist Ewan Birney, Rutherford, a further geneticist and an anthropologist, is promoted widely on social media and is another example of the genre. It is billed by the authors as an “*explainer*” refuting “*pseudoscience*” (Birney, 2019). In fact, in the text they do not attempt any such refutation. Instead, the post comprises warnings about the limitations of genetic research to date, which can be read both ways, and a plausible case for why it is likely that inter-racial trait variation is not influenced by genetics. But at every turn the authors use soft terms designed to tacitly acknowledge the open-ness of the scientific questions:

“A plausible argument for the putative lower average IQ score. Here, “putative” is employed to slightly distance the authors from the very notion, black intellectual

inferiority, they appear to accept since explaining it is the purpose of their “*plausible argument*”.

“It is our contention that any apparent population differences in IQ scores are more easily explained by cultural and environmental factors than they are by genetics”.

Here, “*apparent*” has the same function as “*plausible*” above.

“for most traits, including IQ, it is not only unclear that genetic variation explains differences between populations, it is also unlikely”.

The authors make careful use of the qualified language of the untested hypothesis; “*it is our contention*”; “*more easily explained by*”, “*a plausible argument*”, “*unclear*”, “*unlikely*”. Yet the post attacks peer-reviewed scientific papers and their authors in emotional and unscholarly terms; “*pseudoscience*”, “*darker currents*”, “*semblance of science*”, “*technical-seeming*”, “*misleading*”, “*distorted science*”. With unintended irony, the blogpost specifically attacks “*a cottage industry*” for publishing peer-reviewed scientific papers.

The authors follow the same line as Winston (2004) and Paludi & Haley (2014). The argument against a genetic role in variation between populations is presented as if it were already settled science yet the authors are careful not to suggest that it actually is. Opponents are instead attacked in personalised terms, their peer-reviewed scientific papers discarded without analysis. SR2.0 then insinuates that research which might prove the science one way or the other is itself motivated by racism on the right and scientific ignorance on the left;

“This misuse is mainly from the right wing/cranky human biodiversity/alt right crowd (they are rather odd) but the argument often spills over into a left wing, progressive, genetics of intelligence measures is all hookum (sic)” (Birney, 2019b).

Rutherford (2020) writes: “*people fixated upon finding biological bases for racial differences appear more interested in the racism than in the science....very few people in genetics study questions specifically of race. Only the fixated remain*” (p.179).

Finally, scientists in general and geneticists in particular are; “*honest brokers*” (2019, 1:08.30) who can be trusted to illuminate the path of scholarship, otherwise darkened, as Birney notes, by right wing ideologues on one side and left wing ideologues on the other.

The ostensible central argument of SR2.0 may therefore be summarised in the following arc:

*Scientific racism is defined by the claim by some scholars that IQ variation between human racial groupings has a biological basis. It is rooted in very early scientific error and current pseudoscience. Race and racism are social constructions. Black people **do** have on average lower IQs than white; this is **probably** a function of environment alone. **But**, all that said; “**we don’t know**” because genetics is complicated and much is still unknown. It may be that some genetic explanation will turn up after all. But if it does **geneticists are “honest brokers”** and can be trusted not to tolerate or downplay racism.*

The early part of this arc seems unambiguous and intended to combat the use of genetics as a basis for racist beliefs; it appears to be an attack on ‘bad’ science. However, the way the central premises are then qualified, it is accepted that black people do indeed have lower IQs and that this has social explanatory power, then steadily give way to ambiguity and carefully expressed scientific uncertainty, weakens the argument to a point which suggests its substantive function lies elsewhere. For brevity, two key features are noted here.

First, the argument is invalid. SR2.0 asserts that race and racism are social constructs (Birney et al, 2019, para 3), but also insists the claim of genetic heredity in inter-racial trait variation is a definitive or necessary component of scientific racism (Rutherford, 2015, 2019, 2020, Birney et al, 2019). These two main premises are incompatible, so the argument has a contradiction fallacy at its heart.

The scientific notions that white people are on average more intelligent than black and that this helps explain social inequality is routinely used to justify racial inequality; an example of school selection has been provided above. This, and the related use of psychometric testing for the purpose of selection, may be considered to be racist of itself (Milmo, 2016; Gillborn, 2010) since it produces racially unequal access to services and life outcomes. It is not open to scientists who accept race and racism as social constructs to determine which science is included within the ambit of scientific racism, and which is not. Moreover, if anything embeds the notion of white superiority, this does.

Second, the argument's proponents do not scientifically support its own central pillar; they simply claim that it is more plausible than alternatives. Much care is taken to leave open the scientific possibility that there is indeed a genetic basis for inter-population IQ variation, to play it down and to instead shift the focus to a present lack of evidence which opponents do not in any case dispute; and to warn against simplistic inferences which peer-reviewed opponents do not in any case make, and even then in ways which keep both options open;

*“when we see different IQ scores in different populations, and we know that the heritability of intelligence is high (more than 50 per cent), that doesn't mean **necessarily** that the different DNA variants account for the differences between the populations (p.158, author's bold).*

Why do these ostensibly liberal and anti-racist geneticists produce an argument of elementary logical invalidity? Why do they confidently criticise rival theorists in highly personalised terms (i.e. imply, correctly or not, that they are racist) then quietly play down their confidence in their own central argument? A poor understanding of epistemology seems one cause.

Hayek (Hayek, 1942, 1943, 1944) described the inappropriate application of scientific method to non-science subjects. At the core of this notion is the nature and function of social constructions (Berger and Luckmann, 1966).

Scientism entails regarding social constructions as lesser or even irrelevant forms of knowledge compared to that arrived at through scientific method. As discussed above, Karl Popper and others developed post-positivism as a means of placing empirical reality into its socially constructed context (Popper, 2005). This is the subject of an extensive literature and is visited above.

A topical example might be that the existence of a narwhal tusk can be tested empirically and described in every way. It is a sensory organ; unless it is wielded post-mortem by a human to attack a terrorist, in which case it is very much a weapon (BBC, 2019). The weapon is a social construction, but no less real in the lived experience of the terrorist for it.

However, in an article (Rutherford, 2015) written after he had fronted the BBC series on the subject referred to above, his concluding paragraph begins:

“Race doesn’t exist. Racism does. But we can now confine it to opinions”.

In the first sentence, it is said that race *does not* exist because it is a social construct, while in the second racism *does* exist because it is a social construct. This is incoherent, of course, but hints at what is at the core of SR2.0; that is revealed in the third sentence. Racism exists, but only as some erroneous and unscientific opinion. It is not at all clear what kind of existence the author refers to, but he seems to mean a lesser kind of existence than scientifically proven facts.

Later, the same author (Rutherford, 2020) accepts racism as “*real*” (p.186). This implies an epistemology other than scientific method, but no epistemological development is provided. Race is described as a social construct throughout SR2.0, but no explanation of what this means and how it relates to scientific facts is broached. This reference to the reality of race seems instead a manifestation of scholarly brinkmanship (Gardner, 1992; Gillborn, 2016).

Without any other suggestion of a recognition of other epistemologies, SR2.0 appears to wish to relegate race to an epistemological status subordinate to that of scientific fact, and racism as simply an erroneous opinion. The aim seems at face value an anti-racist one, but without any recognition of an epistemology outside of scientific method this relegation is scientistic and fallacious. It reduces to absurdity a profound phenomenon which impacts daily the lives of many millions of people. Racism is structural and embedded in language, including within science; for people affected it is every bit as real as a small lead projectile flying towards them at high speed.

This subordinating of the social constructs ‘race’ and ‘racism’ to empirically-discovered facts is essential to SR2.0 and indeed reveals its substantive function. This is to protect the application of genetic research by narrowing the definition of scientific racism, thereby excluding almost all claims of racism from its ambit. At a linguistic stroke, it makes scientific racism disappear from “mainstream” genetics. Almost all the constituent parts of

scientific racism pass through this assumed definition like milk through a sieve. A remnant may not pass for now, but there is no true filtration process and even that remnant may make its way through in the end.

One theme within SR2.0 does appear consistent. This is that in the event that science does uncover uncomfortable facts about race and intelligence, geneticists today can be trusted not to make the terrible mistakes their forebears of the first half of the last century universally did.

Rutherford (2020) argues:

*“Hypothetically, if there were genetic differences between populations that have not found yet, and these do correspond with race, the fact that we have not yet found them means they are tiny at best. If those things were true – **and there is no evidence to suggest that they are** – would that have any impact on how we should treat each other? If science were somehow to show that there are genetic differences that align with our folk use of the terms of race, and that these also accounted for perceived differences in ability, would that justify segregation? Would you afford people different rights if they are ancestrally faster, brighter or stronger? (p.185, author’s bold)”.*

Here, hedged around by protective caveats; “*hypothetically*”, “*tiny at best*”, “*no evidence to suggest that they are*”, “*somehow*”, the writer’s very purpose is to acknowledge that a genetic basis for folk categories of race may be turned up by science after all and to urge readers not to use it as a basis for racism if and when it does.

Notably, too, while Rutherford seems to rely on simple logical inference for the assumption that differences between populations must be small, Reich (2018) provides a developed scientific argument about why this is not the case (Cofnas, 2020, p.127). This thesis does not seek to adjudicate rival scientific arguments on this point, but in this case Rutherford simply makes an unexplained or defended point as if it is a definitive argument in itself.

Rutherford (2019) notes; “*Science new, and old to a certain extent, has done nothing but undermine the traditional and folk distinctions of race*” (Rutherford, 2019, 1:09.18). Here, the notion that a small number of bad apples may have spoiled the early case for genetics is notable. In fact, geneticists enthusiastically supported old eugenics until under after World

War Two, even when the science had been fatally undermined (Paul and Spencer, 1995). The Eugenics Society was renamed The Galton Institute only in the 1990s. It continues to celebrate Galton's legacy today. The Mainstream Science statement in 1995 reflected just that; the APA statement of 1996 used folk categories of race; researchers today still use folk categories.

Rutherford (2020) writes of James Watson's 2018 racism ; "*Geneticists had finally had enough*" (p.143). In fact, in 2019 and 2020 geneticists at UCL, led by geneticist and media figure Professor Steve Jones, fought a running battle against a college plan to rename The Galton Lecture Theatre to honour someone not racist instead (McKie, 2019). When Saini (2020) argued that geneticists had at times overlooked and understated their discipline's racist past, geneticists including Rutherford attacked Saini extensively in a much-publicised letter to Nature Magazine (Pomiankowski et al, 2020). At the same time, another scholar documented the enormous resistance from geneticists to renaming a prize in honour of eugenicist and racist RA Fisher (Witen, 2020).

Interviewed by Rutherford for an extensive, three-part BBC programme on the subject of genes and intelligence, leading geneticist Professor Steve Jones is asked about the lessons history may have for the notion of applying genetics to public policy today. Jones replies:

"The facts don't change, opinions do. And I think it would be a great mistake to have the jackdaw of conscience constantly cawing in your ear saying: 'you can't do that because Hitler wasn't a nice man'. I mean that's just foolish" (BBC, 2014b, 27.08).

This quote from Jones is placed by editors into a programme peroration delivered by Rutherford which implies the inevitability and value of applying genetics around intelligence to policy. Jones' misrepresentation of The Holocaust simply as Hitler being "*a bad man*" rather than the consequence of years of ideology and enthusiastic work on the part of geneticists-and-biologists-turned-Nazi-party-officials goes unchallenged.

The same series of programmes features Robert Plomin more than any other scholar. His views on genetics and IQ are given a long airing on multiple occasions; he is, after all, a leading scholar in the field. No comment whatever is made about his belief that inter-racial IQ variation is likely in part genetic.

SR2.0's epistemological and structural weaknesses, and its strategic intention, reduce even its reliability as a guide to the state of genetic science. It argues that genetics is going through accelerated change and some of the science which previously underpinned scientific racism has been controverted. This is true. But it also accepts that many other variables remain in the air.

And since SR2.0 accepts the existence of trait patterns within populations at some level, again because of the constructed nature of race it is not possible for scientists to control what race means. Like any social construct, it can change in meaning. Proponents argue that populations and groups exist which are not presently considered races. But this has no bearing on whether the term race can or will be adjusted in meaning to fit the patterns as new discoveries are made through molecular study.

There are scientific, epistemological and philosophical arguments to be had here, for sure; a mechanism for transparent discourse is essential. Meanwhile, SR2.0, to paraphrase it;

*It is true that self-defining white people have on average higher general intelligence than self-defining black and that this helps explain racial inequality, that heritable trait patterns do exist within populations but these don't perfectly correlate to folk conceptions of race, and that intelligence and other traits are heritable within groups. But genetics probably doesn't explain the differences between racial groups; although, admittedly, it might because **we don't know**. But in any case, whatever science turns up, it's wrong to treat people unequally on the basis of perceived racial traits....*

appears a fine example of how **not** to argue with a racist.

4.5 Discussion

Procedural colourblindness (Paul and Spencer, 1995) is in evidence across nations and institutions in spite of the obvious fact that half a century of the principle has left significant variation in outcome between black and white people; indeed the phrase and sentiment was employed on the radio at the moment the words above were being written (Ziegler, 2020).

Over the latter half of that half-century, a genetic explanation for this variation, formally proposed by Jensen (1969), has been marginalised by scholarly institutions. Scholarly

bodies such as the APA and AAA have sought to navigate a route through these difficult waters which embraces the social implications of scientific scholarship and yet does not deny uncomfortable science. In the case of Anthropology, greater scientific credibility has been conceded in order to lean more heavily into an emphasis upon the sociological.

Edugenics colourblindness uses officially-sanctioned procedural colourblindness as cover to conceal what its proponents think is likely to be a partly genetic explanation for black-white average intelligence variation. In this way, it seeks to, in Duster's (2015) terms, "back" the genetic explanation for inter-racial variation "into" studies which do not refer to it. This appears more cynical than procedural colourblindness. Certainly, any policymaker who adopted edugenics ideas into education policy only to discover the racial implications a few years later would be entitled to think so.

Scientific racism is often used today ostensibly to refer to the specific idea of a genetic influence upon claimed inter-racial variation in intelligence. The targets are early scientists such as Galton and contemporary scientific inquiry referred to as pseudoscience. Yet at the same time, Galton remains celebrated by geneticists.

SR2.0 is an argument which amplifies in the media the politically-finessed positions laid down by the APA and AAA. Its ambiguous and nuanced structure seeks to deny, on a highly selective basis, that scholars with whom it disagrees are indeed scholars at all. It is subject to a number of fallacies and weaknesses. It claims to oppose scientific racism but by accepting almost all the tenets of heritage scientific racism succeeds only in refining it. The primary purpose of SR2.0 appears to be to defend wider genetic research from charges of racism.

SR2.0 appears to have little or no scientific value; it is an argument invariably made not in peer-reviewed journals but instead in blogposts and popular science books. It appears manifestly scientistic; it is an attempt to de-fang science proponents largely accept but find socially uncomfortable. The greatest risk it presents is that it frames anti-racism as a biological argument, when the theory it rests upon here is highly contested; if the science becomes unstuck then it may weaken and relegate the larger moral principle of racial equality.

Edugenics itself, however, does not appear the weaker for either its colourblindness per se, nor the charge of scientific racism. Its weaknesses are instead a question of true intent. Scholars press ahead with the application of scientific method and ignore philosophical and social problems, such as those around race, altogether. How is it possible to write a whole book about education with barely a mention of any educational literature? Or to propose policy and make judgements about what has and has not policy implications, without reference to the literature of policy or political science?

Scientists are rightly brutal when social scientists misunderstand scientific principles. So it is hard to understand why eminent scientists would foray into social science without understanding the need to master the relevant literature first. Harder yet to understand why enormous time, money and scientific skill would be directed into behavioural genetics research searching for polygenic effects upon intelligence, only to pitch the results in a way which includes the implausible rejection of established educational orthodoxies with little more than a dismissive wave of the hand.

Colour blindness and scientific racism are only two examples of hazards around edugenics which are so far almost wholly uninterrogated. The risk of social determinism is discussed at chapter five. Yet these things do not affect the science of edugenics; they affect its presentation and context.

But why press ahead in any case with a line of scientific inquiry which relies for its application so implausibly upon the acceptance by policymakers of profound new social propositions? Why not at least concurrently examine in scholarly fashion whether there is genuine policy scope for application? Why not substantiate some practical possible uses of DNA testing in early special needs education, for example? This would require a multidisciplinary team, but the scale of the ambition and funding of eminent scholars such as Robert Plomin could surely readily accommodate this?

The answer to these questions may lie in the dual-use risk of eugenics referred to above.

The primary fruit of the work of edugenics scholars such as those in the Plomin laboratory at Kings is increasingly sophisticated polygenic scoring which emerges from the polymorphic effect of single nucleotide polymorphisms working together and with the

environment. They focus their ideas about the application of this science ostensibly on education, but their references to education are invariably, and strangely, unscholarly to the point of absurdity.

The scale of philosophical and practical upheaval required within any education system to accommodate planning programmes around DNA testing, not least simply requiring everyone to have such tests in the first place, is almost unimaginable. And what do edugenics scholars promise in return? Some loose and ill-defined clichés about teaching to peoples' strengths and providing more help to children with special needs?

As noted at chapters one and two, genetic engineering technologies such as CRISPR may in future be executed to follow the polygenic data provided by edugenics scholarship. But since it is yet to be used for even health therapies and the ethical discourse around it is turned to loud in any case, this is a very long way off, if ever possible at all.

Embryologists, on the other hand, presently provide IVF clients with a choice between embryos based on little or no information. New commercial services are already available which seek to change this. Edugenics scholarship, and scholars themselves, are at the core of an emerging technology which may realistically permit embryo probabilistic selection for cognitive and related abilities in the very near future. This, rather than the upending of how societies do education, seems the more plausible primary purpose of edugenics.

Chapter 5: Drawing together and conclusion

This research inquiry has explored key aspects of the science and historical antecedents of an area of scholarship and advocacy it refers to as edugenics. Such research is carried out mainly by psychologists working as behavioural geneticists. Intelligence, psychometric and statistical theory is employed in the service of molecular genetic research. The aims are the probabilistic prediction of cognitive ability through the analysis of genetic material; and the subsequent application of this foresight to the delivery of education or, perhaps more likely, embryo selection.

A full critique of the science of edugenics is, for reasons of length and focus, beyond the scope of this thesis but there is much critical literature aimed at doing that job (Gillborn, 2015; Turkheimer, 2016; Turkheimer et al, 2017; Comfort, 2018), The paper has instead sought to show where edugenics literature extends beyond the science into other scholarly fields, and where literary devices are employed to evade contentious problems such as those presented by the subject of race in humans.

This literary evasion and invalid extension and into other fields of scholarship, such as education or wider public policy, is important for least two reasons.

First, because here the scholarship moves from valid if contested scientific research into unevidenced opinion and fallacious reasoning about non-science scholarship. This is such a profound weakness that it suggests edugenics scholars view it as a price worth paying in order to cover risks, such as that of accusations of racism, while the scientific research carries on apace. In this way, it is more a token effort than true scientism.

Second, because of way the errors implicit within scientism proper, notably the failure to apply any epistemology other than scientific method, led many psychologists and geneticists working in the 20th century first to support ideas which led to the miscegenation laws and the Holocaust, then into open conflict with racial equality legislation.

This has led to an edugenics scholarly style which seeks to avoid contentious social and philosophical discourse through the defensive use of authorial gamesmanship, evasion and even fallacy.

Throughout the thesis, a historical approach has noted the epistemological assumptions and scientific trends which informed 20th century eugenics, scientific racism and genocide. Critical Theory literature, notably that of the Frankfurt School, has been used to show how a science and non-science scholarship require a multi-layered epistemology in order to work constructively together. Critical Race Theory literature provides a perspective through which we may view one risk implicit within edugenics research; the charge of scientific racism. Other themes visited and discussed have been scholarly gamesmanship amongst some scientific scholars, and the use of the media to amplify misleading messages.

The purpose of this conclusion is to draw together features of, and arguments about, edugenics literature; to make comment about its meaning and most likely applications; to reflect on where contentiousness and ambiguity within edugenics simply reflects the same within the wider fields of psychology and genetics; to warn of the risk created by hazards presently unexposed to policymakers; and to make recommendations around effectiveness and ethics.

5.1 History lessons

Early scholars such as Linnaeus and Galton are widely celebrated today as distinguished scientists of considerable historical note. In contradistinction to respectively their taxonomic and psychometric work, which remains highly respected amongst many scholars, their racist views are often presented as a function of their time and place which led them to make long since falsified scientific errors.

These errors are often characterised as the epitome scientific racism. Geneticists still regularly debunk scientific racism on this basis today (Rutherford, 2020). However, the basis for the work often labelled scientific racism over the last century is not the crude and erroneous normative cultural assumptions of the still much-celebrated Linnaeus and Galton, but the intelligence scholarship from Spearman onwards, inspired by Galton, which sustains much scholarship and applied psychometric practice today. This is not to condemn it per se, but it should at the very least behoove us to be very careful not to allow its implications for the wider fields of psychology and genetics to be swept under the

carpet. Moreover, this might commend a Lakatosian perspective on the specific claims of edugenics, where for the purposes of policy they are treated as open and conditional rather than settled.

Genetics and eugenics were inextricably intertwined until they were separated post-Holocaust by worried geneticists. Geneticists today sometimes present a clear distinction between erroneous eugenics and legitimate genetics scholarship. However, the fact that celebrated geneticists of the day supported eugenics in spite of known theoretical weaknesses hints strongly that such scholars felt larger truths were in play and that these were somehow validated at a higher level. Given that for half the life of the field of genetics many geneticists enthusiastically lobbied for, then participated in, forced sterilisations, organised mass executions and finally genocide it would be absurd not to consider this history when approaching potential innovations in genetics today.

This thesis has not had space to pursue in detail the notion of ‘new’ eugenics. Certainly, there is important debate to be had about whether genetic engineering, embryo selection and other potential new technologies at least in spirit constitute Galton’s eugenics minus the messy business of old-fashioned sexual reproduction. The opinion of the author is that in view of the horrors of eugenics first time around it is better to start with the warning flagged by the label eugenics then consider whether new eugenic measures are socially desirable, than to bury the nature of the new moral choices society faces in the hope no-one will notice. This principle has been applied to the term edugenics used here to give temporary definition to a field which has so far received too little ethical attention.

Behavioural geneticists say they may very soon create a technology able to predict to a high degree of accuracy which of a number of embryos is most likely to come towards the upper end of the IQ variation of around 10 IQ points typically present amongst embryos produced by the same human couple. New technologies such as pre-implantation genetic testing (PGT) and iterated embryo selection (IES), and indeed simply using present capabilities in egg donor selection, have the potential to greatly multiply this effect. In a world of growing international and domestic economic disparity, such technologies could lead to an engineered IQ gap – or increased gap depending upon one’s perspective – between rich and poor. It is hard not to see this as eugenic in nature.

That said, Agar's notion that new eugenics can be defined by its exclusion of government control seems insufficiently robust as a means of delineating old and new eugenics. Presented as a matter of parental freewill, there is surely a risk that service access would follow capital as usual and a eugenic effect would become observable through government inaction? For the less well-off, the freedom to buy embryo selection technology would then be mediated by the economic system in the same way as the freedom to buy a Rolls Royce. Dominic Cummings' writing seems apposite in this respect. In the end, this thesis does not propose a solution to this naming dilemma, just to raise it.

That geneticists in the first half of the 20th century held to eugenics even when the science seemed obviously wrong symptomatised their normative worldview. For them, society was best shaped along lines determined by scientific method. Other epistemologies and intellectual perspectives were judged by the service they could provide to scientific method and considered lesser knowledge. This broad approach led to genocide.

At the same time, scientists driven by ambition sought to build weapons of mass destruction without the policy responsibility for their use. They successfully vapourised entire cities. In each case, after the wholesale killing, the scientists involved mainly carried on with their lives as before. Lessons have not always been learned; to re-state leading geneticist Professor Steve Jones';

"it would be a great mistake to have the jackdaw of conscience constantly cawing in your ear saying; 'you can't do that because Hitler wasn't a nice man'. I mean that's just foolish" (BBC, 2014b, 27.08).

The notion of race in humans has been used here to explore risk implicit within edugenics. The period since Galton has been characterised by acute racism and geneticists have played their part in this; for example through an unscientific targeting of Jews and Roma, and through a narrative about the intellectual inferiority of black people which remains firmly in evidence today. To be sure, a new narrative from liberal geneticists that we should accept average black intellectual inferiority as a function of environment hardly marks a step forward. Indeed, in policy terms it seems little more than a banal PR move.

Critical Race Theory (CRT), in spite of its sometimes postmodern turn, provides a perspective which emphasises the ongoing, pervasive and insidious nature of racism today.

Anti-racist and racial equality legislation has been in place in developed economies for half a century, yet profound inequality still exists. Structural and indirect racism has replaced openly racist legislation. CRT takes racial equality as its first principle, while edugenics in effect has the processes of scientific method as its own first principle. This sets up a potential clash of epistemologies and ethics. Built into the scholarship of edugenics, via the larger fields of scholarship from which this literature extends, are assumptions about the intellectual inferiority of black people. Black people on average have lower IQs than white and this leads them to poorer educational results and less enriched life outcomes across the board. This is simply science, they say. Edugenics literature has responded to this presentational problem by simply ignoring it through systematic colour blindness.

Scientific Racism 2.0, however, is a more insidious construction of some geneticists seeking to impose a scientific definition of the social construct racism. It uses scapegoats to deny science's ambiguity on the matter of race, then employs the mass media to avoid scholarly scrutiny. Such authors accept virtually all of the hereditarian science while claiming an anti-racist mantle for largely presentational reasons.

Because racism is a social construct, there is no reason a valid scientific theory cannot also be racist. For example, if it is considered racist to ascribe poorer social outcomes amongst black people to their lower average IQs, then orthodox scholarly opinion, such as that expressed by the American Psychology Association in its 1996 statement on the matter, amounts to racist sentiment. The attempt by SR2.0 authors to insist that racism must be defined by a claim about genetic influence upon IQ variation between races reflects both epistemological confusion and artifice.

From a CRT perspective, engaging with conditional scientific ideas like this on their own merit risks conceding to scientists the setting of the parameters of the discourse. Science, as the Frankfurt scholars suggest, proceeds according to imperatives such as ideology and funding. The history of IQ is that of white scholars finding correlations within, and imposing explanatory power upon, how people perform in tests compared to how they flourish in societies constructed by white people. Meanwhile, wider science proceeds as informed by the power of capital. Ongoing scholarship in fields such as epigenetics cautions against overstating the importance of current scientific orthodoxy.

Edugenics scholarship is criticised in this paper not for its science per se but for its evasive literary devices, yet such devices are not the preserve of edugenics scholars. Others, like proponents of SR2.0 seek to control the definition of racism and thus define their way out of the problem. Finally, as is argued below, scientists are provided with templates by their own institutions and by august funding bodies. Where research seems evasive on a matter such as race, it seems likely that such institutions and funders are part of the problem.

5.2 The Plomin Dilemma

Historical statements on race and intelligence by key scholarly bodies such as the APA (1996) and AAA (1998) have overtone of pragmatism and small ‘p’ politics. This is consistent with some scholars’ emphasis upon the lack of purpose and value of race and intelligence study, or even its social harmfulness (Chomsky, 1972; Schlinger, 2003).

What is lacking is a coherent account by scholars who say their view of the science has changed of where their science was wrong before they changed their scientific opinion, and how they corrected this in the theoretical underpinning of their scholarly work. This is of course not necessary for the signatories of the Mainstream Science on Intelligence Statement (1995), whose authors, such as Plomin, Lynn, Gottfriedson, Jensen and Herrnstein and Murray, contend there is likely to be a part-genetic explanation for inter-racial IQ differences.

The APA statement uses racial categories throughout; this may present a difficulty for those who wish both to deny the empirical status of race while employing the statement as a scientific source. It also uses Herrnstein and Murray, Lynn and Jensen and Plomin as authoritative scholarly sources. It confirms a significant difference between the average IQs of black and white people and restated the predictive validity of IQ in respect of individual educational, social, vocational and economic success. It notes that IQ is highly heritable within groups and cites Loughlin et al (1995) and Herrnstein and Murray (1994). It raises the issue of whether this inter-group heritability makes the notion of between-group heritability more plausible. On this point it suggests that Lewontin’s example of the same seed being sowed in very different fields might apply if it was felt that the social experience of black and white people, in ways not allowed for in IQ tests, were as different as Lewontin’s seeds. It concludes this section;

“the issue ultimately comes down to a personal judgment: How different are the relevant life experiences of Whites and Blacks in the United States today? At present, this question has no scientific answer”.

Finally, the statement notes that the inter-group variation does not extend from test bias but that there is no evidence of a genetic effect upon group difference; it insists that the cause is unknown;

“If group differences in test performance do not result from the simple forms of bias reviewed above, what is responsible for them? The fact is that we do not know”.

The APA and AAA statements are, however, the basis of frequent claims, notably with SR2.0, that a genetic causation is pseudoscience and that a wholly environmental explanation is settled science. This is simply untrue. Indeed, it is not at all the contention of the hereditarians that evidence exists, but that it is more plausible that inter-group IQ variation is caused by genetics and environment together rather than the latter on its own. They also contend that future molecular research is likely to provide the evidence to support their argument.

As noted above, some hereditarians publish on the subject of race, but many prefer not to. Scholars who do conduct such research are often criticised in personalised terms by proxy means such as criticising funding sources or personal intent.

But it has been argued above, in relation to Duster’s “backing in”, that this position amongst hereditarians within edugenics is informed by colour blindness. That is to say, the avoidance of race is part of a strategy to avoid a socially contentious issue until it is too late because such research has already been applied to policy.

This broaches a profoundly important point which has yet to receive a reply from those who oppose race and intelligence research.

Two substantive reasons are often given for opposing research into race and intelligence. First, that it may confirm a genetic causation of inter-group variation and this would be socially harmful. Second, that the harm cannot come from proof of genetic causation since

none can ever exist, but instead comes from the credibility such research bestows racist ideas in society at large.

Both of these arguments are turned on their head by the concrete policy proposals and colourblindness of edugenics scholars, combined with the seriousness with which the UK government appears to take such proposals. The first argument would block research which could prevent policy designed to avoid social harm; the second becomes an appeal to blind and unscientific hope over responsible risk analysis.

What is referred to here as the Plomin Dilemma is therefore as follows:

1. *Edugenics, in the form of personalised learning informed by genetic testing, IQ testing and the probabilistic prediction of learning predispositions, is a lawful and unregulated technology.*
2. *If genetics influences inter-racial IQ variation, edugenics may yield biologically racialised patterns of education.*
3. ***We do not wish to research inter-racial trait variation because this is racially harmful. But if we do not carry out such research, we cannot know if edugenics will be racially harmful.***

This is not quite a true philosophical dilemma; it calls for more information about how much harm each option might do. But it does function as a useful device for understanding the root choices facing policymakers. At present, racialised patterns of provision exist as caused by environmental conditions. In some parts of England they also exist on the basis of 11+ testing. The UK already tolerates a degree of racialised provision. However, for reasons CRT tell us are quite likely caused by structural racism, these notions have limited traction in public discourse.

The innovation of DNA testing for education would seem likely to place edugenics and genetically-informed education near the top of any national policy discourse. It seems unlikely that policymakers would wish to tolerate a new technology that could lead to the genetic racialisation of education. Supporting the status quo requires policymakers to put their faith in an unscientific anti-hereditarian proposition. Meanwhile, correlations already available through GWAS analyses would provide a strong scoping tool, and constantly evolving molecular research techniques would be available for further confirmatory research into the risk of what would after all be a revolutionary change to education policy.

Alternatively, policymakers, professional bodies and employers could prevent the use of personal genetic information in general education. However, this would entail in effect banning an innovative technology where no public harm had been demonstrated. This may have read-across to other technology-related decisions involving risk.

Elsewhere pharmacogenetics, the trend in medical research towards personalised medicine, has obvious implications for race and ethnicity. Whether any given line of research amounts to scientific racism on the one hand, or to well-directed science and medicine on the other, is best judged by the non-white perceivers and victims of personalised and structural racism (Pena, 2011).

Edugenics researchers often stress the application of their research to the field of early learning difficulties. Where such conditions are medically diagnosed, it may be that edugenic interventions could be judged by the same principles as pharmacogenetic ones. This could, however, cut both ways.

5.3 Scientific Racism 2.0

Scientific racism is a charge often laid upon scientists described as hereditarians. This description specifically refers to their belief that there is a part-genetic explanation for measured IQ differences between self-identified racial grouping. These scholars, exemplified by the signatories of the Mainstream Science on Intelligence statement (1995), argue that IQ is highly predictive of a wide range of social, economic and educational outcomes; that society is broadly structured along the lines of IQ; that poorer people have lower IQs than richer people and this is highly heritable; that black people have lower IQs than white; that intra-group variation is highly heritable; that there is no evidence that inter-group variation between black and white is heritable but this, along with environmental affect, is more plausible as a cause than environmental affect alone.

Scientific Racism 2.0 (SR2.0) accepts all of these premises except the last, which they hypothesise is unlikely rather than likely. SR2.0 authors do not publish papers in response to the papers of opponents.

5.3.1 Social and popular media amplification

The style of SR2.0 is to publish in popular rather than scientific form in order to avoid scholarly review; to conceal the presentation of hypothesis as settled science through rhetorical and authorial devices; to throw up chaff in order to evade crux questions of science; to employ personal attacks where it suits their purpose.

SR2.0 misuses scientific method by applying it to questions which require an epistemology informed by notions of social construction and thereby conforms to Hayek's critical description of scientism. Its style is the antithesis of Habermas' communicative rationality; it seeks to frame discourse using scientific method while making rare but tactical, superficial and wholly undeveloped appeals to social constructionism. For example:

"Race does not exist. Racism does. But now we can confine it to opinions" (Rutherford, 2014, after fronting a three-part BBC documentary on the subject).

*"We are prone to saying glib things such as 'race doesn't exist', or 'race is just a social construct' ... race most certainly does exist **because** it is a social construct [Rutherford's emphasis]"* (Rutherford, 2020 , pp20-21).

This apparent reversal of opinion is, in an entire book, accompanied by no ontological explanation of what is meant by *"exist"*. Such an explanation is essential because without it we cannot know anything about the author's epistemological assumptions, which also go wholly unexplained and undeveloped. Indeed, the latter quotation is followed by; *"If race is a social construct, there is a biological basis to that too"* (p.21). Here, Rutherford confuses the crude use of skin pigmentation and other physical traits to define race with the social construct itself; by this means biology is given a bridgehead into the world of social construction. But the social construct is by definition wholly social; white people are perfectly capable of racism against other white people. The remainder of the introductory chapter is literally a long series of statements of equivocation which stress the complexity of biology and say nothing of epistemology; the entire book follows in this style.

Habermas sought, through communication, to find an accommodation between scientific method and a world of different theories of knowledge. His placing of communication at the core of meaning requires proponents of competing arguments to find optimal solutions through a series of rules which amount to an authentic intellectual engagement with no funny business. SR2.0 is the antithesis of this. Its use of social and popular media to promulgate hypothesis as fact, to selectively ridicule scientific opponents in the hereditarian camp while all the while still adhering to their main ideas appear to be manifestations of a calculated intention to engage in bad-faith discourse with strategic intent.

For example, Galton is condemned as a racist in spite of his then-normative views, but also as a scientist of great historical note. Lynn, whose work is used extensively as a scholarly source in the pivotal APA statement (1996), and actually by Rutherford himself, is presented not as a scientist but a “*pseudoscientist*”. Plomin, the single most interviewed scholar in the BBC documentary series on the subject (2013) and with Lynn a fellow hereditation and signatory of the Mainstream Science on Intelligence statement (1995), is never questioned once about the matter and is thanked for his advice in the preface of Rutherford (2020).

SR2.0 is characterised by, amongst other things, the calculated avoidance of peer-reviewed submissions. Social media is granted a powerful role.

For example, as with Birney et al (2019) the scientist status of its four authors is exploited in the form of blogpost and support is generated through social media (Twitter, 2020). Although the blogpost involves a simple untested hypothesis and calls the notion of a genetic link simply “*unlikely*”, it includes plenty of personalised attacks on publishing scholars and equivocates over the central question at issue. It is lauded on social media (Colquhoun, 2020; Shattuck-Heidorn, 2020; Key, 2019), including by science journalists (Nichols, 2019) and politicians (Lammy, 2019) as a sterling example of anti-racism in science. The authors provide extensive comment in dozens of systematic, follow-on tweets (Birney, 2019c); some are personalised attacks on others, others follow a core line of intellectual reasoning. They ask for influential Tweeters to amplify their views and are obliged (Birney, 2019d).

Finally, other scholars actually use the blogpost approvingly as a scholarly source in a peer-reviewed journal (Booth, 2020). In this way, a well-informed piece of polemic posted on social media enters the scholarly mainstream unburdened by the scrutiny implied by peer review or, indeed by any scholarly standards at all.

In the same vein, Rutherford (2020) receives extensive support across social media and in the UK receives starring reviews from journalists including arguably England's most famous vicar (Fraser, 2020). A racist mass murderer is singled out by a US scientist who literally suggests that if he had read this book; "that could save lives", he may have changed his mind. (Harden, 2020). The enthusiastic endorsements upon its sleeve are from a famous rabbi ("*succinct genetics*"); a famous travel writer ("*essential reading in an age of false science*"), famous campaigning and media figures ("*a master storyteller*", "*the ultimate anti-racism guide*") and a hotelier-historian ("*far reaching, insightful and brilliant*"). All are white.

In this way, SR2.0 bypasses scholarly engagement and accumulates popular anti-racist and scientific credibility through social media and mass media. It should be noted that this is quite unlike the common phenomenon of well-known scholars writing popular science books or articles and engaging in media debate. There, scholars use published research, their own and that of others, as a foundation of more speculative arguments for public interest (Pinker, 2011; Plomin, 2018). If the speculation is laid on thick with a trowel and the scholar moves far from his area of competence in search of high readership, then the book is judged more as a novelty than a serious scholarly work (Wilson, 1998; Dawkins, 2006). With SR2.0, there is no scholarly work at all; authors simply use social and popular media to go from reasonable informal hypothesis to damning all opponents and claiming victory; all without actually seeking to rebut the ostensible cause of their outrage. What lies behind this deception?

Here, edugenics may help provide an answer.

5.3.2 The purpose of SR2.0

As noted above, SR2.0 authors hold to almost all the same positions about race as those hereditarian scholars whose scholarship they describe as pseudoscientific. Notably, they agree that much racial equality can be explained by black people having lower IQs than white, although this is always expressed in veiled language. They create a battle-line with hereditarians in respect of whether or not inter-racial IQ variation has a part-genetic causation. While this may look solid on their media of because of the rhetoric of “pseudoscience” and “darker currents” (Birney, 2019), it is in fact a dotted line. They simply say it is unlikely rather than likely. They lay out a plausible and highly qualified hypothesis, but do not research it or test it. They attack those who do seek to do so in personalised terms, although this is done selectively. Plomin is frequently commended and thanked; he is never criticised for his hereditarian views but is criticised for his style.

Some younger geneticists laud Plomin’s scientific work but question his outright evasion of race. Defending a Plomin scientific argument against a critic, Birney (2019e) nevertheless complains;

“I have to admit I find a lot of his (Plomin’s) more recent stuff unnuanced and there are better and more sophisticated ways to use genetics in studies of intelligence/ educational attainment”

Harden (2018), reviewing Plomin (2018), argues that Plomin’s avoidance of race; *“will strike many readers, particularly in America where racial divisions loom large, as irresponsible”*.

There is uneasiness amongst younger geneticists that edugenics colourblindness, avoiding mention of race and racism as Plomin has done since the Mainstream Science on Intelligence statement (Gottfredson, 1995), is no longer viable in the context of advancing genetics research. The *“nuance”* is wrong in this day and age, Birney suggests. The stylistic nature of this criticism from authors who often speak publicly in support Plomin’s science is important.

An additional argument put by SR2.0 is that historical biological racial categories are invalid; they give what appear to be plausible reasons for this. These are built around the Lewontin’s observation (Lewontin, 1976) that all humans have most DNA in common, leaving little room for variation between perceived biological races and much room within

them. There is an often-put counter-argument to this (Edwards, 2003), but this thesis does not intend to judge the science. Instead, attention is drawn to the primary research interests of SR2.0 geneticists.

Birney is described (The Royal Society, 2020) as;

“a bioinformatician who has made significant contributions to the analysis of genomes. Through his development of innovative bioinformatics and computational biology tools, researchers around the world are able to predict and annotate regions of interest in DNA with speed and confidence”.

A key area of interest listed at the same source is; *“population genetics”*. He is a former supervisee of geneticist Professor James Watson (Wikipedia, 2020). In a recent extensive scholarly contribution (Grose, 2020) and on Twitter (Birney, 2020), Birney suggests a possible genetic link between Covid 19 and the population of dark-skinned, BAME people.

Elsewhere (Birney et al, 2019) it is argued with plausibility that it is incorrect to conflate populations with race but does not make it clear if he thinks the two things will indeed sometimes amount to the same thing. The field of study here is the identifying population groups through the computational and statistical analysis of DNA. He seeks practical applications in the field of health and is a consultant and adviser to a number of private sector companies in this respect (ERMB, 2020; Birney, 2019f). The notion that such populations may help biologically underpin racial categories is naturally an unwelcome risk to this field.

Rutherford (2018) agrees with Plomin’s idea that all children should be DNA tested for subsequent policy use and, like other SR2.0 authors, lower IQs have explanatory power in respect of explain social and racial disparities.

Scally is a co-author of Birney (2019). Another computational geneticist, his most recent listed co-authored peer-reviewed paper (Skov et al, 2018; University of Cambridge, 2020) detects, in modern populations, archaic introgression between homosapiens, neanderthals and denisovan populations. The abstract includes:

“(We) detect archaic introgression in 89 Papuans and show how the identified segments can be assigned to likely Neanderthal or Denisovan origin. We report more Denisovan admixture than previous studies and find a shift in size distribution of fragments of Neanderthal and Denisovan origin that is compatible with a difference in admixture time. Furthermore, we identify small amounts of Denisovan ancestry in South East Asians and South Asians”.

In the Summary, the authors note:

“there are advantages in having methods independent of reference sequences, both to reduce bias and to detect possible introgression from groups for which we currently lack a reference genome. In this paper we describe such an approach, in a statistical framework which exploits the fact that introgressed regions will contain a high density of genetic variants that are private to the group receiving the divergent material. We apply this method to 89 Papuan genome sequences”.

Scally, a computational biologist, and his colleagues are therefore engaged in research aimed at finding identifiable groupings, or populations, of human beings through analysis of human DNA. There are no doubt legitimate potential applications for scholarly work in this area, but such scholars have an interest in attacking any notion of a link between their work and the shoring up of a biological argument for inter-racial IQ variation.

In an article reporting on the American Association of Physical Anthropologists (AAPA, 2019) updating of the 1998 AAA statement, Raff (2019) quotes one genetics doctoral student;

“We aren’t denying that patterns of genetic variation exist, in fact that’s precisely what most of us study. We are, however, saying that race is not a useful framework for discussing or investigating human biological variation and continuing to use it stalls science more than advances it”.

Birney is quoted too;

“It is sadly all too easy to think race is somehow the everyday manifestation of human genetics but the truth is far more complex and interesting. Our collective genetic history is messier, richer and more complex than concepts of race”.

The thrust of this argument is, then, that there is much human diversity and it is fine for geneticists to look for patterns and variation and indeed to create categories, but it is unsophisticated and inaccurate to assume that these patterns “clearly” (AAPA, 2019) map over racial categories in common usage. The AAPA (2019) statement includes;

*“Genome/environment interactions, local and regional biological changes through time, and genetic exchange among populations have produced the biological diversity we see in humans today. Notably, variants are not distributed across our species in a manner that maps **clearly** onto socially-recognized racial groups (author’s bold)”.*

“Clearly” here, combined with the stress upon of complexity and expression of unknowns, implies the possibility that there may indeed be mapping in some form but that it is not ‘clear’. It has precisely the same function as “perfectly” in Birney et al (2019) and Raff (2019) below;

*“Research in the 20th century found that the crude categorisations used colloquially (black, white, East Asian etc.) were not reflected in actual patterns of genetic variation, meaning that differences and similarities in DNA between people did not **perfectly** match the traditional racial terms” (author’s bold).*

Rutherford (Raff, 2019) argues: *the colloquial and traditional descriptions of race that are commonly used in the West are not **accurately** reflected by underlying genetics.*

Anti-hereditarians here wish to draw a line between racist old categories informed by empire and conquest, and their new biological categories which they say may not be called races but may be called populations or groups. They wish to control when it is legitimate to use the word ‘race’. In this way, they seek to exorcise the charge of racism from genetics and anthropology. But this will not do at all since although they make passing and often reluctant reference to race as social construction, there is no evidence at all in the literature that they have considered the implications social constructions have for discourse around race and racism.

“Race doesn’t exist; racism does. But we can now confine it to the domain of opinions” (Rutherford, 2013)

“It isn’t good enough to say that race doesn’t exist, tempting though that might be. Race certainly does exist, because we perceive it and racism exists because we enact it. (Rutherford in Raff, 2019).

Here, “tempting though that might be” signs the reluctance with which social construction is addressed and hints at why is not developed in any SR2.0 literature and media work. This is a fundamental weakness not simply of SR2.0, however, but of the core anti-racist argument made by the APA, AAA and AAPA in their various statements.

A CRT perspective illuminates the fact that pervasive racism in wider society does not rely on the “accurate” or “perfect”, or otherwise, mapping of DNA populations to racial folk categories. SR2.0 creates an Aunt Sally of racists who quote bad science as if this accounts for most racism faced by non-white people. Yet even at the biological level, the claimed science is not as clear-cut as SR2.0 and the relevant professional bodies wish to make it. This creates a hazard for any anti-racist argument based upon genetics.

To juxtapose Skov et al (2018) and the AAPA (2019) statement, for example:

“introgressed regions will contain a high density of genetic variants that are private to the group receiving the divergent material. We apply this method to 89 Papuan genome sequences” (Skov).

*“variants are not distributed across our species in a manner that maps **clearly** onto socially-recognized racial groups (author’s bold)” (AAPA).*

Papuans are highly heterogeneous, with relatively high denisovan and neanderthal genetic presence and thousands of very small ethnic groups today. Can we be sure to any level of scientific provenance that some indigenous Papuans the subjects of Skov et al do not constitute a socially-recognised racial group? There is no reference to this in the paper one way or the other, likely because it did not occur to the researchers to mention it or perhaps to even study it since this would have required a different epistemology and a different field of research altogether.

Meanwhile, well-reported racism in West Papua, where indigenous people are routinely described as “monkeys” (Martinkus, 2020), may turn around the very; “private grouping(s) receiving the divergent material”, Skov et al describe.

It is therefore misleading and likely simply empirically wrong to argue that that such “private variants” will *never* map onto a recognised racial group. Perhaps this seems far-fetched in the context of the census-like categories still used even by these very geneticists, but around the world much racism reflects majority attitudes to minority ethnic groups at varying tiers of localisation; Chagossians in Mauritius, Chan in Cambodia, ethnic Nepalis in Bhutan, Rohingya in Myanmar.

And how do we determine what degree of accuracy or clarity, to use the adjectives provided by SR2.0 and the AAPA statement, of gene-to-race mapping would be required to validate the notion of a biological dimension of race? What similarities at what points on the genome would amount to a racially discrete group? These parameters would be as much a function of language and communication as of science. In other words, the problem of race even at this empirical level demands a combination of scientific and non-scientific epistemologies. Instead, SR2.0 wishes to impose meaning through science alone. Even there, they provide no criteria; one suspects because they have not thought about it.

Just as edugenics scholarship is, in effect, forced to shoulder the responsibility for scholarly assumptions made much more widely in psychology and genetics, SR2.0 bears the burden of questions evaded by other scholars elsewhere in the relevant disciplines. Genetics has a terrible history intertwined with eugenics and genocide; august anthropological bodies still find it necessary to put out statements today insisting that unlike their practice throughout modern history their scientific assumptions today do not amount to racism. Without addressing other epistemologies as equal partners on the subject of race, as Habermas would suggest, their protestations are not scholarly but are instead political; their purpose is to defend their respective fields of inquiry from damaging attacks and not to confront pervasive racism.

5.3.3 Anti-hereditarians and hereditarians meet at the back

As a final feature of this political phenomenon, it can be shown how some anti-hereditarians and hereditarians in the end come together to find a common position in order to remove race from genetics by linguistic means. Here, the dichotomy is forgotten and edugenic colourblindness fuses with SR2.0.

Ritchie (Kings, 2020) is an intelligence researcher, a member of Plomin's lab at Kings and a Plomin co-author (Malanchini et al, 2020; Selzam et al, 2019). He is the author of; "Intelligence; all that matters" (Ritchie, 2015; Birney, 2019). He was supervised at Edinburgh University by Plomin co-author Professor Ian Deary (Plomin and Deary, 2015). In a controversial (Weinberg, J; 2020) paper arguing for free inquiry into reported inter-racial IQ difference, Cofnas identifies co-authors Ritchie and Deary (Ritchie et al, 2015) as hereditarians (Cofnas, 2020, p.136).

Ritchie et al (2018) studies the difference in brain size and function between men and women. He is co-author with Deary and others (Hill et al, 2019) of a paper which identifies 149 genetic loci which appear to impact upon social status. In common with edugenics papers, the introduction begins; *“An understanding of the causes underlying the association between socioeconomic position (SEP) and health is likely to be helpful to minimize social disparities in health and well-being”*. It is not explained how showing that society is structured around lines of genetic inheritance might help minimise social disparities. This is typical of the magical thinking contained with otherwise scientific edugenics papers mentioned above.

In respect of variation between and across groups, Ritchie is co-author with Plomin and others (Selzam, 2019) of a paper which argues that correlations between family groups are stronger than within groups;

“GPS prediction estimates for cognitive traits (intelligence and educational achievement) were on average 60% greater between families than within families..... SES [social and economic status] is a major source of between-family prediction through rGE [genotype environment-related correlation] mechanisms. These results provide insights into the patterns by which rGE contributes to GPS [genome-wide polygenic score] prediction, while ruling out confounding due to population stratification and assortative mating (Abstract).

If socioeconomic position reflects genetic inheritance and correlations between family groups are in evidence, this may be considered to at least have possible implications for the hereditarian notion that applying a similar study to inter-racial groups may also yield relevant loci points. Moreover, if society is structured along lines of heritable IQ and black people are typically less well-off than white, this too might suggest a hereditarian framing worth examining for its potential racial implications. This is where edugenics employs its own brand of colour blindness by being silent on the subject of race.

Ritchie, however, as a young scholar has none of Plomin's baggage. He avoids difficulties with scientific racism by adopting a new style. When mention of race is unavoidable and colour blindness will no longer suffice, Ritchie uses social media to attack what he describes weak arguments which fail to support hereditarianism, but does not reply when asked if he thinks there are stronger ones which succeed (Ritchie, 2017).

To recap, ‘hereditarian’ is used here as it is commonly employed within discourse around intelligence, education and genetics. While of course genetics is the study of heredity and human variation, the term specifically refers to the notion that inter-group racial variation of IQ is in part heritable. For scholars who accept the strong predictive validity of the dominant measure of intelligence, psychometric intelligence as measured by IQ testing, this boils down to a disagreement over whether the black-white IQ difference they both accept exists is caused by the environment alone or by both the environment and genetic inheritance. The latter are hereditarians, the former ostensibly anti-hereditarians.

This means that the anti-hereditarian argument revolves around intelligence theory and accepts the IQ conception of the hereditarians. On that note, leading anti-hereditarian geneticist Ewan Birney explains on social media, as ever;

“it is amusing to me that some people claim we don't understand genetics and human population history. I am aware of my intellectual limitations - which is why I always enjoy hanging out with people who know more than me in all sorts of topics...in terms of IQ genetics, it's @stuartjritchie and KCL/Edinburgh crew(s)”.

Here, a leading anti-hereditarian geneticist explains that he is not an expert on the crux matter of “*IQ genetics*” and so consults a single favoured source. That source is a member of Plomin’s lab who researches hereditary group IQ difference, argues that society (with black people typically less well-off than white) is structured along heritable IQ lines, and argues for latter notion to be applied as a general principle to social policy.

Rutherford, too, cites Ritchie as; “*one of the people from whom I’ve learnt the most*”, about genetics and intelligence (Rutherford, 2019b).

Social media is of course an unscholarly source, yet it can be analysed in a scholarly fashion and their use by scholars to make extensive arguments as a proxy for scholarly publications is of note. Where scholars choose to live by social media, they also risk dying by it. That is to say, anti-hereditarians as referred to in this paper often dismiss social media attacks upon them as fluff but this risks self-invalidating their own social media content.

There is social media material written by other scholars, for example, which draws attention to the close relationships between, and views of, ostensibly anti-hereditarian geneticists and their hereditarian colleagues (Schneider, 2020). These have no scholarly value but illustrate one risk of attempting to move discourse about scholarship out of peer-reviewed publications and into social and popular media.

There is considerable peer-reviewed discourse around the subject whether or not there is a genetic effect upon what many scholars in both hereditarian and ostensibly anti-hereditarian camps agree is a measurable and consistent IQ difference between self-identified racial groups. There has been no scholarly resolution between those who think it likely and that this will be revealed as part-genetic by molecular level research, and those who say it is unlikely.

Scholarly bodies such as the AAA, APA and AAPA have sought to lay out the fundamentals of the science while protecting the reputations of these fields of study; they have not confirmed about racial group IQ heredity one way or the other. This leaves all these fields, but perhaps most notably genetic research, open to the charge of latent scientific racism if this single variable is left, as SR2.0 does, as the single determinant. There is no logical reason an empirical truth cannot also be racist, in any case, since the latter is agreed by such scholars to be a social construction. This is problematic for geneticists, particularly in view of that field's history.

Edugenic colourblindness, so effective for scholars such as Plomin since 1994, is no longer sufficiently plausible. The issue of race cannot be ignored, in large part because of movements such as Black Lives Matter. In this context, SR2.0 agrees that black people on average have lower IQs than white but inserts a wedge between it and hereditarianism on the fine point of whether it is likely or unlikely that this intelligence variation is partly heritable. There is no research to demonstrate the point either way, and the hereditarians do not dispute this, but off the back of this carefully nuanced distinction, SR2.0 attempts to create a chasm with some (good, anti-racist) geneticists on one side, other (bad) pseudo-scientists, on the other. This is then amplified through social media and finally sold as agreed science through popular media.

SR2.0 epitomises Habermas' strategic communication. It seeks to frame a discourse which requires multiple epistemologies using its own alone, to evade channels which may expose it as incorrect or invalid, and to stress channels of influence which will impact upon public opinion. In this way, it both stresses its own importance and reduces the risk of harmful charge of scientific racism. All while in reality jettisoning none of the positions which have characterised scientific racism for decades.

The chief hazard presented by SR2.0 is that it accepts a framing of racism which society has moved beyond. The notion of arguing with extremist racists about genetics seems both absurd and intellectually regressive.

Anti-racist discourse, as CRT observes, must instead engage with racism which pervades institutions, people's unconscious beliefs and with structural racism across society. Institutions, governments and policymakers today routinely express agreement with this, at least. Why risk, in any case, the possibility that some geneticist will discover cases where folk categories and heredity do indeed map, or where some genetic component is found in the reported black-white average IQ difference? In a discourse where genetics is reified, such notions would give more power to the elbow of said extremists and racists.

It is suggested here, to put it no more strongly, that many geneticists are conscious that there are remarkable new technological innovations in the pipeline as a consequences of genome mapping and vast computational power made available in the last few years. But also that there are large ethical question makes over many of them. In some fields, such as CRISPR and health applications, this is openly accepted and there is meaningful public discourse. In other areas, notably where intelligence theory, genetic research about populations, and public policy some together things are very much muddier. SR2.0 seeks to mitigate risk around issues of race and social determinism by keeping it muddy through denial of the uncertainty of science on matters of race. An ostensibly anti-racist argument which relies upon uncertain science is hazardous to the very cause of anti-racism.

5.4 Genetic Determinism

This paper has examined scientific racism as an example of the risk presented edugenics scholarship. The paper will not extend to a similar critique of genetic determinism, but there is much overlap and so one point is mentioned in brief here.

Edugenics scholars often stress that linking, for example, IQ heritability and social and economic position is not deterministic; *“It is worth reiterating the mantra that polygenic scores are inherently probabilistic, not deterministic”* (Plomin, 2018, p.151). This is because their tools are probabilistic. Heredity provides propensities and not certainties, notably in the face of environmental conditions. If scientific determinism requires 100% predictive validity at the level of the individual, it is certainly true that edugenics and related scholarship is not deterministic. It is offered here, but no more than that for reasons of space, that when it comes to matters such as race, determinism can be understood in a quite different way.

Imagine a group of 1000 randomly-chosen people being given a heavy pail of water to carry then paired off with unencumbered people and required to race them over 100 metres. We may expect that some cases pail carriers would win – fast sprinters might be paired with people of much lower mobility and thereby overcome the pail handicap. Overall, though, the pail carriers’ team would always lose. As Gillborn (2015) points out, this individualisation and authorial gamesmanship accompanies what he calls “educational gene-ism”. It enables the two following statements to co-exist in the same book (Plomin, 2018);

“What would you think if you heard about a new fortune-telling device that is touted to predict psychological traits like depression, schizophrenia and school achievement? What’s more, it can tell your fortune from the moment of your birth, it is completely reliable and unbiased – and it costs only £100. This might sound like yet another pop-psychology claim about gimmicks that will change your life, but this one is in fact based on the best science of our times. The fortune teller is DNA” (Prologue).

“as emphasized repeatedly in this book, genes are not destiny and heritability describes what is, not what could be (P.154)”.

Public policy is invariably applied at the collective level, whether local or national. There is at the very least a case to be made that determinism can realistically function at this level. If some pail carriers, or black people, do well in spite of the conditions ranged against them, this does not reduce the deterministic assumptions which the whole group faces collectively. In this way, edugenics appears deterministic in terms of its use in common parlance.

5.5 Ethics

The UK Medical Research Council's; "Good research practice: Principles and guidelines" (UKMRC, 2020) includes:

"Researchers supported by the MRC should consider at an early stage of the design of the project how they will adhere to the principles and standards of Good Research Practice over the course of their research and aim to anticipate any issues or challenges that might arise" (para A.1).

Under "research misuse" para 2.e, the same document runs;

"The risks of research outcomes being misused for harmful purposes... must be considered throughout the whole life-cycle of an MRC-funded study. Mechanisms must be in place to ensure that a thorough risk assessment is undertaken, any risks of misuse are identified and actively managed".

Shulman and Bostrum (2014) cite Plomin (2013) to note that sub-gene genetic material which affects human cognitive function is highly dispersed, so analysis which could lead to predictive validity useful in embryo selection for that purpose requires the vast scale provided by Genome Wide Association Surveys (GWASs). The UK Biobank is referred to as a relevant source of data in this respect. The paper notes:

"In the longer term, as DNA testing becomes a routine part of medical care, data sets of tens of millions of individuals may be assembled from data produced for medical reasons. Such databases could be matched against standardized test scores, educational data, and income to produce extraordinary sample sizes at low marginal cost. Thus, while our understanding of the genetic correlates of cognitive ability is very limited today, it is set to increase dramatically in the coming years".

The authors note how the derivation of human sperm and eggs from human stem cells, or stem-cell gamete derivation, could compress the effect of multiple generational change through embryo selection into a single generation (via iterated embryo selection, or IES).

Advances in cognitive function, small over one generation, could therefore be greatly increased in effect in short order. Even so, because of cost, the authors suggest the effect embryo selection for cognitive performance upon human capital in the coming years will be limited by cost and uptake. Subsidy would be one policy solution to this constraint, they say.

At his blog (Cummings, 2019), the UK prime minister's chief adviser, Dominic Cummings, has given embryo selection much thought over the years. Reporting assumptions of a 2014 meeting organised by Larry Page, Google and Alphabet co-founder, which Cummings attended, he notes; *"there is a reasonable chance we will have found many of the genes for IQ within a decade via BGI's project, and the rich may use this information for embryo selection"* (19 Aug, 2014 post). Cummings argues for the state to fund embryo selection in future in order to avoid a genetic overclass emerging from a situation where only the wealthy can afford the new technology.

In a 2019 post (21 Feb) Cummings writes extensively of the embryo selection work of Professor Steve Hsu, who founded BGI, mentioned above; *"What seemed sci-fi in 2010-13 is now reality"*, he notes in reference to his earlier post. Plomin, who is listed by BGI as an adviser (BGI, 2020), is described as; *"the world's leading expert on the subject"*. The core of the long post is the work of Hsu and Plomin. Cummings describes his long relationship with the two, including inviting Plomin to deliver talks at the department of education (Merrick, 2013). Cummings urges the present UK government, of which he is often referred to as one of the most powerful members (Shipman, 2019), to take expert advice from Plomin and Hsu. Parens et al (2019) cite Hsu and begin a cautionary paper; *"Embryo editing for higher IQ is a fantasy. Embryo profiling for it is almost here"*.

This paper is unable to explore the intellectual underpinning of the ethical policies of UK funding bodies and scholarly institutions. It does, however, suggest that even at the simple level of a requirement for researcher to consider the uses or misuses of funded research, there may be an ethical or procedural lacuna present in respect of edugenics.

There is ample evidence to at least suggest that edugenics research funded by bodies such as the MRC may have, as a primary end purpose, the development of a technology for embryo selection on the basis of cognitive traits. The MRC and other bodies do of course

fund research around embryo selection, but the author has not been able to establish whether this is overtly the case with edugenics research. However, whether the end-use intention is embryo selection or education, what *is* clear is that such scholarship employs a stylistic device described in this paper as edugenics colourblindness. This is a mechanism designed to evade the implications such research may have in respect of race. At the very least, it seems an inappropriate approach for leading research which advocates for its own application as public policy.

Elsewhere, The Lexinome Project is reportedly a \$20m Yale University research project led by behavioural geneticist Professor Jeffery Gruen (Yale, 2020a). Much of the expenditure is upon the salaries of six full-time specialist teachers employed over a number of years to deliver support to children with early reading difficulties. Participants do not receive a dyslexia diagnosis. The three “*aims*” of the project are given as providing high grade reading intervention to struggling students, providing appropriate assessments and spreading best practice (Yale, 2020b, para 2). In fact, the “*goals*” of the research are very different. These are:

“to create a pre-symptomatic, genetic screener for dyslexia, examine genetic and environmental connections to reading and learning disability, examine language and attention connections to reading ability, and investigate the possibility of genetics enhanced intervention selection.... the long-term goal of the study is to test the hypothesis that in the future information about genetic variation can inform a precision educational plan or reading intervention for students with dyslexia.” (Yale, 2020a).

Of course such a screener would apply equally to embryos as to children. Meanwhile, only children whose parents have agreed to their DNA testing may access this much-needed resource. A criterion for school selection is that researchers wish to collect the DNA of children of non-European ancestry (Yale, 2009; Yale, 2020, paras 35-6). It is clear from reportage that parents are torn between accessing a much-needed resource and facilitating an approach to education which stresses the genetic inheritance of struggling black pupils:

“one of the study's most powerful benefits for parents or the district itself—the opportunity for free, intensive, one-on-one reading support for the district's most struggling young students—also may make it difficult for potential participants to refuse” (Spearman, 2018).

“I don’t have the comfort in the research history, on the backs of black and brown people, to rely on it. We know that the history of research in our community has been void of communication, void of humanity: doing experiments on black women because we don’t have ‘pain receptors’..., knowingly giving diseases to black and brown people then sending them out to continue to be sick..., radiation research. What they’re doing for the children doesn’t bother me. What bothers me is that we got to this point. I’m hoping that that in the future any protocol brought to the New Haven Public School system — whether I’m sitting at this table or not — is vetted, not just by an outside [institutional review board] but by a New Haven school committee,” she went on. “I am going to vote for this protocol. But it’s not because I’m 100 percent backing how it was put forth. It’s because I know that there are minority children definitively benefiting from this and I know the struggles of a dyslexic” (Peak, 2018).

The parent of a child with early learning difficulties quoted above is reported to be a paediatrician and local school board member. Her words questioning the research review processes, including those of funders and universities, seem apposite.

In a statement supporting Black Lives Matter, United Kingdom Research and Innovation (UKRI), the UK non-governmental body which channels government funding into research insists;

“We have begun work to address our structures, our work environments and the ways that we may be perpetuating problems – in terms of who we represent, who we invite to the table, who we partner with and fund. This is something that we will be focusing our energies on as we do the work that is needed to right the systemic wrongs that racism creates” (UKRI, 2020).

UKRI, UKMRC, other funding bodies and scholarly institutions such as Kings College London may find it timely and fruitful to examine what may be an ethical lacuna on the issue of race at the core of edugenics.

5.6 Politics

At Chapter Two it was noted that Lauder (2020) argues that the intellectual neoliberal perspective upon education has been hollowed out by the decline of Human Capital Theory and the failure of school market reform. It is beyond the scope of this thesis to explore the basis upon which pre and post-war economists such as Keynes, Hayek and Friedman influenced what might be described as rival but coherent practical policy ideas about how a good society might be developed and sustained. But it is tacitly suggested that a pattern of influence exists today which is worthy of further study, notably in the context of education.

Dominic Cummings is the chief policy adviser to a UK prime minister highly successful as a campaigner arguably because his approach to policy appears extremely flexible.

Cummings himself, arguably the most pivotal single individual in the UK's departure from the EU, has laid out the intellectual underpinning to his ongoing policy ideas with unusual candour and detail.

Cummings' blog (2019) is an ongoing piece of work which consists so far of many thousands of words over a number of years. It has been published at great length by The Guardian newspaper as an insight into the thinking of a policy adviser with what may be unprecedented influence over the direction of UK public policy. The blog is an intellectual endeavour but is studiously not written in scholarly terms. It is sometimes flippant and contains some unsupported arguments, but it is wide-ranging and conveys detailed and powerful imperatives for political action.

In philosophical terms, Cummings' writing is rooted in conceptions of human nature as much as assumptions about economics. His aim seems to be to build effective policy upon transparent intellectual foundations. Cummings discusses with enthusiasm EO Wilson's notion of consilience, the edugenics of Plomin, the embryo selection work of Hsu, the centrality DNA testing to future health policy and much else besides. Their science is at the core of Cumming's thinking.

This work red-lines scholarly objections to such ideas, some of which are contained within this thesis, and proceeds to calls for action. Cummings was previously the Special Adviser (SpAd) to then-England Education Secretary Michael Gove and his work then gives strong indications of he may see edugenics progressing now.

A key early feature of what is often described as a neo-liberal approach to education was, under the UK's then Blair government, to encourage Education scholars to buy-in to new managerialist and marketized structures in state education. New institutions, such as the National College for School Leadership (NCSL), had the ostensible purpose of placing teaching onto a more professional footing. In practice, these new structures sought to change the intellectual underpinning of the organising and delivery of education to fit neo-liberal imperatives. In due course, the UK's Cameron administration, from 2010 to 2015,

closed institutions such as the NCSL and The General Teaching Council for England. Under Michael Gove, resigned to what he and Cummings saw as the unreconstructed attitudes of Education Scholars, their functions were re-absorbed into the Department for Education and Skills. Dominic Cummings set about creating a new Educational nomenklatura.

New organisations, such as Teach First (Teach First, 2020), were imported from the US to provide access to Teaching in ways which by-passed the influence of education scholars. New organisations, such as ResearchEd (2020), were encouraged as alternatives to conventional educational scholarship; now quasi-independent schools and academy chains helped fund it through in-service training fees. A common theme was the development in schools of ‘evidence-based’ practices founded ostensibly on the experience of teachers. A feature was the fast-development of ambitious young professionals through quick promotion in newly-created school structures and, notably, through the trend for some to spend a short time training as teachers then move directly on to stand as representatives of a new class of educational thinker steadily displacing formerly influential university-based scholars.

For example, Daisy Christodolou first laid out her educational theory in a popular book entitled: “Seven Myths About Teaching” (Christodolou, 2014) after a 2 year career in education spent qualifying as a teacher through Teach First. Shortly afterwards, she was described by the conservative educationalist Anthony Seldon as one of; “the 20 most influential figures in British Education” (Seldon, 2017). Former teacher Tom Bennett, now the UK government’s educational Behaviour Tsar, assembled the high-profile educational conference and publishing platform ResearchEd. Andrew Sabisky, a ResearchEd contributor, was recruited to the prime minister’s policy unit by Cummings. David Didau moved from teaching and ResearchEd talks writing educational books consumed by trainee teachers. Alex Beard (Beard, 2020), who also spent two years in education qualifying as a teacher through Teach First, now works to spread the private business sector ethos of Teach First to the developing world via Teach for All. Teach for All has a board dominated by public-spirited private sector investors who specialise in the developing world.

Beard used his “*expert insight*” to write the popular educational book *Natural Born Leaders* (Beard, 2018). He exploits the same expertise and experience in presenting BBC

Radio 4's "The Learning Revolution" where he interviews other experts such as Daily Christodolou about the future of education (BBC, 2020c). That future, it turns out, will be dominated across the world by new technology and complex algorithms. Children may have chips inserted into them at birth to assist their learning. There is no social contextualising of education in this confidently expressed, and arguably nightmarish, view of how education will be; no discussion of values or power or the kind of societies sovereign peoples may wish to create.

Meanwhile, Sabisky has made widely reported remarks to the effect that black Americans have on average lower IQs than white (BBC, 2020). Supporting this notion, Didau (2017) writes; *perhaps it's more reasonable to describe the position of those who deny the existence of these issues (racial IQ gap) as racist?* Citing Gottfredson et al (1995) at length, he explains that science has spoken and the case is closed; *"The IQ gap between different groups is a matter of fact. To deny that this is the case does no one any favours"*.

This use of a new nomenclatura is intentionally ideological. It astro-turfs the field of education scholarship with innovative ideas mainly not (yet) rooted in much scholarship. Much of the media's reportage fails to reflect this (Green (2020)). It also fails to grasp the wide support the notion of racial IQ variation has within the fields of psychology and genetics as discussed in this thesis in the context of Scientific Racism 2.0. Instead, by means of social media, popular publications and now BBC productions, the principles of edugenics are, alongside hollowed-out neoliberal ideas, amplified and increasingly presented as orthodoxy through trusted channels to millions of people. It is at least plausible that some of them will endure and thereby inform policy.

The Plomin Dilemma may, however, be the sticking point for edugenics in education. The public momentum which appears to favour edugenics seems considerable. But the issues of racism and wider racial injustice are prominent in public discourse and likely a higher priority for politicians and governments of all stripes than the imperatives placed upon perceived 'science' and 'evidence' in policy. This may be why the ideas of Jensen then Herrnstein and Murray have not found purchase in the United States. Plomin's; *"I don't need to research race"* in the face of the racial implications of his theory looks unsustainable. The scientific claims of Scientific Racism 2.0, evidently supported by many of England's new educational nomenclatura, may when examined prove similarly

insufficient to the task of defending the assumptions about race it appears to exist to protect.

It is worth noting, perhaps for the purpose of future research, that a conventional conservative narrative is that of people overcoming the environmental difficulties they face, ‘pulling themselves up by their own bootstraps’, to take their place in a meritocracy. Today’s UK government has ensured the promotion to the highest level of non-white and working class politicians in part to emphasise this theme. As Plomin points out, edugenics in theory acts precisely counter to this conventional narrative. Edugenics may therefore realistically be seen by conservatives as anti-conservative.

Embryo selection, however, for which Cummings has received considerable criticism for supporting, may plausibly have a sufficiently strong basis in discourse around Health policy to survive the closer scrutiny the new eugenics implicit within edugenics. This might in the end be Plomin’s larger scientific purpose.

5.7 Conclusion

This thesis has explored the literature of behavioural genetics research aimed ostensibly at improving the delivery of education; edugenics. The history and lineage of relevant fields of scholarship have been developed. Critical Theory (CT) and Critical Race Theory (CRT) have contextualised and informed the study, given perspective and provided a prism through which to view the problem of race as an example of unexplored risk within edugenics scholarship.

The paper has not sought to challenge the science of edugenics as there is already considerable literature in place in that respect. Instead, the paper responds to what appears to be a gap in the literature; it assumes the broad scientific validity of edugenics scholarship and considers its lineage, coherence and wider implications. The science is described, but most attention is given to the internal logic and implications of a number of things asserted explicitly within the relevant literature of edugenics, in addition to a number of other things purposefully left unsaid.

Edugenics, it is proposed to the modest limits of this short thesis, emerges as a fast-moving area of scientific research pursued by leading behavioural geneticists. A, or perhaps The, leading authority in the field is Professor Robert Plomin of Kings College, London. Plomin is a psychologist, behavioural geneticist and scientist of historical note.

The literature is characterised by its preparedness to advocate for the use of personal genetic information in the delivery of education. Scientific method provides the sole epistemological framing. This leads to the strong impression of scientism, a term popularised by the economist Friedrich Hayek to refer to the inappropriate application of a scientific epistemology to non-scientific subjects. A number of authorial devices are employed to evade the risk sometimes present when a field of scientific scholarship raises issues which may be socially or philosophically contentious. In this respect, this paper follows on from Gillborn (2016), who observed the presence of “scholarly brinkmanship” (Gardener, 1994) where scholars squirrel away in the text generalised statements which appear counter to their central line of reasoning, then dig them up when seeking to parry accusations of controversy.

Edugenic scholarship is also characterised by what this paper has called “edugenic colourblindness”, where the risky issue of race is not mentioned because of its possible implications for policy extending the scholarship. The paper suggests this device is reaching the end of its sell-by date and is steadily being replaced, although not by Plomin himself, by what is described here as Scientific Racism 2.0.

Edugenics takes on a burden of risk from the fields of psychology and genetics, where it is rooted. These fields contain considerable ambiguity towards socially contentious matters such as what are sometimes called scientific racism and genetic determinism. While scholars elsewhere in these fields may keep over a bargepole’s length away from these inherent problems, Edugenics’ policy advocacy means they must either confront them or evade them. Confrontation, by means for example of an acceptance of ambiguity around scientific racism, could lead to irreparable harm to the area of study. Evasion is the preferred route. Duster’s notion of excluding potentially contentious assumptions from research parameters then ‘backing them in’ as they emerge after policy application is apt here.

This paper does not challenge the science of edugenics. Scientific Racism 2.0 (SR2.0), however, emerges as an unscientific creature of Habermas' "*strategic communication*" as a new generation of geneticists, some in the field of edugenics, whose wider profession is historically mired in horror seek to protect their field from renewed charges of scientific racism. They do this by creating a faux anti-hereditarian/hereditarian dichotomy then redefining scientific racism in a way which excludes their views and research. It is characterised by personalised attacks, literary evasion and the presentation of hypothesis as agreed and orthodox science. SR2.0 is employed by some geneticists but only as amplified through social and popular media; not in scholarly form.

Indeed, although SR2.0 attacks the arguments of scholars such as Reich (2018, 2018b) the author has been unable to find a single peer-reviewed paper on any subject by its key proponents. Still, Rutherford has written a book about genetics richly praised by Birney; "*Adam Rutherford does an excellent job, explaining genetics, not shying away from controversy*" (Birney, 2018). It is a Ladybird book (Rutherford, 2018b). Since then, Rutherford's 2020 book has become one of the UK's best-selling popular science books of 2020 and is an exemplar of the genre.

Geneticists today use vast computational power to examine huge DNA databases to study human variation and categorise human populations. SR2.0 is essentially an evasion of the fact that because race and racism are social constructions they cannot control their meanings in respect of human variation and population. It is not possible for scientists to define what racism is without reference to other epistemologies; that is Hayek's "*scientism*". Ostensibly anti-hereditarian scientists may not unilaterally exclude from the domain of racism, for example, their belief that black people are on average socially, economically and educationally successful than white because they on average have lower IQs. This is a problem for wider genetics, psychology and anthropology steeped as their histories are in overt racism.

Edugenics scholarship makes proposals for education, but typically extend well beyond the competence of the scholars and the authority of the literature. Public policy and education literature is rarely, if ever, mentioned. The edugenics notion of grounding education, and wider public policy, in a principle that the purpose of state expenditure is to level up genetic unfairness as opposed to environmental unfairness is profound, yet its scale and

implications go unremarked upon in the literature. There is no attempt to justify the upending of the entire education system through developed ideas about education. This points towards the likelihood that edugenics is not aimed primarily at education but is instead intended as a technology of human embryo selection. Research funding bodies and institutions do not appear to recognise this.

In the end, it may be that the science of edugenics has scientific application which brings benefit to society at large. But any future application will require a full and honest analysis of its possible implications and side-effects, notably in respect of subjective issues it presently ignores such as race and determinism.

Meanwhile, society must not, I suggest, concede the framing of discourse around race and racism to those who still argue about genetics as a basis for racial inferiority or superiority. That is not; *“How to argue with a Racist”*; it is precisely How not to Argue with a Racist. As Reich has suggested, the aggrandised and scientistic use of genetics to fight racism is miscast as anti-racism. Instead, it risks bolstering racists by reifying the role of uncertain and ambiguous science.

Racism is widely recognised today as a pervasive social ill which people and institutions can only truly combat it by placing it above other conceptions of social progress, such as economic growth and new technologies. This is a status it still lacks today, after half a century of relevant legislation. The notion that black people have on average lower IQs than white is a deeply destructive one in policy terms. Perhaps at some point in future epigenetics or some other science will show more clearly how environment works on gene expression to create claimed group performance variation, if indeed it exists. Perhaps we will discover racist assumptions within the algorithms employed by computational geneticists. Until then, the idea has nothing to offer anyone except despair.

Genetics, and epigenetics for that matter, likely have profoundly important roles to play in human progress. But, as history shows, disaster only lurks where their application does not respect other appropriate epistemologies and worldviews.

5.8: Reflections

My purpose in addressing the coalescing of current behavioural research and education, particularly in respect of possible ethical and policy implications I mention, is to help strengthen the area of scholarship by critiquing what I see as fundamental flaws and evasions in some present scholarship. My intention was from the outset not to judge the science of scholars like Robert Plomin, but instead to accept the scholarly quality, plausibility and relative orthodoxy of their work and to show some of its potential ethical hazards. My view is that the work of such behavioural scientists will quickly take on considerable public and political importance from now on. If policymakers and the wider public are to take informed positions on which applications of such research may or may not represent human progress, it will be necessary to do so with a clear view of the true implicit risks and opportunities.

My focus has not therefore been upon the science itself, but about the underlying epistemology of the literature and about the presentational intentions of some authors. This led me to my primary methodology of literary analysis and criticism. A more complete treatment may have involved empirical research into what people and scholars mean when they use or hear words like “racism”, “race” and “determinism”. More analysis, too, of the scientific case presented by Plomin and others, and indeed its contestability, is still clearly in order and had this thesis been longer would have strengthened the basic arguments contained in the thesis.

My approach takes a liberal framework which does not, for example, reject enlightenment thinking nor explore a postmodernist approach to the application of behavioural genetics to education and embryo research. My limited use of the later Critical Theory of Habermas, notably his ideas about human communication and intent, takes the liberal conception of such work and reflects my wish to reflect Habermas’ own desire to be of practical use in the world. This in turn implicitly reflects my own rejection of many of the tenets of contemporary post-modernism. My view is that contemporary post-modernist approaches often suffer from internal intellectual and political problems which lead them to be of little practical use in society at large and, indeed, that this often specifically undermines the original intent of Critical Race Theory (CRT). These underlying views are not tested or explored in the thesis, but they do flavour it; they may therefore be considered biases.

While this may be a weakness, the points I raise may be of value in each specific case. I hope, of course, that the thesis holds together in terms of the broad themes it seeks to deal with, including often unstated phenomena such as authorial gamesmanship and small ‘p’ science politics. I began my research with opinions, notably about race, and I have a desire to use the research to make a (very small) difference in the world. This is consistent with the spirit of Critical Theory and Critical Race Theory, even if I reject many of the ideas associated with them. Again, these preconceived notions may represent less desirable traits in a doctoral candidate; or they may be considered compatible with my axiomatic rejection of a broad postmodernist approach. In any case, my intention has been to expose some ideas to the light and I believe that even with these weaknesses the thesis may be of modest value to readers from both scientific and non-scientific backgrounds.

46449 words

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