

The Uses and Abuses of Biology: Neuroscience, Parenting and Family Policy in Britain

A 'Key Findings' Report

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Summary

The study summarised here took as its starting point the growing frequency with which claims about neuroscience, and what it is said to tell us about children, populate policy documents and statements by senior officials responsible for health and welfare services. The study was conducted by sociologists at the University of Kent and Aston University and funded through the Faraday Institute's 'Uses and Abuses of Biology' programme.

The key conclusions of the study are:

- Brain claims enter a policy context which is already convinced that something must be done about parents.
- Brain claims, challenged elsewhere as lacking scientific foundation, are imported and repeated in the British context.
- Brain claims serve a rhetorical and metaphorical function, opening up the parent child relationship to earlier and more intimate interventions.
- Brain claims intensify the demands on parents by threatening lifelong consequences and reinterpret the ordinary practices of loving families as meaningful only for brain development.
- Brain claims emphasise emotions, not IQ, as fundamentally determinate of future health, wealth and happiness, thereby placing the emotions of new mothers under considerable pressure and scrutiny.

Further information about the project and its findings can be found at:

<http://blogs.kent.ac.uk/parentingculturestudies/research-themes/early-intervention/current-projects/>

Project findings are also discussed in more detail in the book *Parenting Culture Studies* (Palgrave 2014):

<http://www.palgrave.com/products/title.aspx?pid=656367>

Further information about the 'Uses and Abuses of Biology' research programme can be found at:

<http://faraday.st-edmunds.cam.ac.uk/uab/>

Background to the study

Neuroscience can now explain why early conditions are so crucial: effectively, our brains are largely formed by what we experience in early life....scientific discoveries suggest it is nurture rather than nature that plays the lead role in creating the human personality....It has been said that 'the greatest gift for a baby is maternal responsiveness'. The more positive stimuli a baby is given, the more brain cells and synapses it will be able to develop.

(Graham Allen MP and Iain Duncan Smith MP, 'Early Intervention: Good Parents, Great Kids, Better Citizens', published by The Centre for Social Justice and The Smith Institute, 2008, p57)

The early years of life are a crucial period of change; alongside adolescence this is a key moment for brain development. As our understanding of the science of development improves, it becomes clearer and clearer how the events that happen to children and babies lead to structural changes that have life-long ramifications. Science is helping us to understand how love and nurture by caring adults is hard wired into the brains of children. We know too that not intervening now will affect not just this generation of children and young people but also the next. Those who suffer multiple adverse childhood events achieve less educationally, earn less, and are less healthy, making it more likely that the cycle of harm is perpetuated, in the following generation.

(Sally Davies, Chief Medical Officer, foreword to 'The 1001 Critical Days: The Importance of the Conception to Age Two Period', a cross-party manifesto by Andrea Leadsom MP, Frank Field MP, Paul Burstow MP, Caroline Lucas MP, published by the 1,001 Critical Days Campaign, 2013, p2)

The first extract above is taken from a document by the Centre for Social Justice and The Adam Smith Institute, published six years ago. (One of its authors is, of course, now a senior member of the Government, the other the author of Government-commissioned documents advocating 'early intervention' and Chair of the Early Intervention Foundation [1]). The second is from a more recent document, authored by a group of MPs and endorsed by twelve further members of the House of Commons and the House of Lords and by 36 third sector organisations advocating early intervention.

Both contain a set of very similar claims, expressed using particular language, as follows:

- 'Early conditions' or the 'early years of life' are described as 'crucial';
- It is said that early experience 'largely forms' our brains and does this biologically, and so it is said this experience leads to 'structural changes' in the brain;
- The claim is repeated that 'neuroscience' or 'the science of development' has told us these things about the brain and so they are known or understood;
- It is stated that the brain is directly affected in this way by what the parents of children do; 'positive stimuli' leads to 'brain cells and synapses' and 'love and nurture' is claimed to be 'hardwired' into the brain;
- 'Intervening early' is described, on the basis of these contentions about the brain and what parents do, to be a necessity to arrest a 'cycle of harm' that otherwise carries through 'generations'.

Biologised claims of this kind centring on statements about early brain development have thus emerged as a dominant theme for English policy making, leading to an argument about the need to reorient policy goals to intervene in parental 'nurture'. Given the apparent rapid emergence and spread of this biologisation of policy, this study sought to explore both the content and context of this ostensible new departure for policy making. The aims of the study were:

- To review the existing literature about the 'scientisation' of parent-child relationships historically and identify the central themes that emerge;

- To trace the adoption of ‘brain-based’ claims articulating the need to change parenting practices by English education and public health policy from 1997 onwards, identifying a time-line for their appearance and expansion in these policy fields;
- To detail the reference points and purported evidence-base for ‘brain-based’ claims, identifying similarities and differences between policy documents, and between policy fields;
- To identify the discursive role of ‘brain-based’ claims in framing new policy agendas, specifically by detailing the conceptualisation of ‘poverty’, ‘inequality’, and ‘social mobility’ associated with these claims;
- To detail the challenge made by current policy discourses to the normative assumption that parenting style is a ‘private matter’.

We highlight four main themes that emerge from the study:

- Early intervention as a cause in search of an argument
- The questionable claims of infant neuroscientism
- The dramatization of ‘nurture’
- Continuity and change in official concerns

Methods

The study comprised three areas of analysis:

1. Policy documents

A sample of policy documents (n=41), representative of the formation of parenting policy across a number of domains (social exclusion, health, maternity services, early years, crime and justice) was gathered from the period 1997 to 2013 and subjected to qualitative content analysis using NVIVO software. Most documents were published or commissioned by government departments but in addition, a small number emanating from early intervention advocacy groups were included. The analysis focused on the way the relationship between parenting and

social problems was discussed and when, where and how claims about the infant brain interacted with these concerns. [A full list of documents can be found in the Appendix].

2. Literature review: the ‘first three years movement’ and ‘neuroscientism’

Literature was reviewed that considers the academic discussion of brain-based claims-making and policy intervention in early childhood. Literature was found by searching Google Scholar using variations of the keywords ‘brain’, ‘neuroscience’, ‘child’, ‘0 to 3’ and ‘early intervention’. Results were evaluated and selected for their relevance to the topic of brain-based early intervention. Bibliographic references of relevant items were then followed up to further expand the sample. The search was restricted to work produced in the English language, finding work by scholars from the USA, Canada, the UK and New Zealand, and from a diverse range of academic areas, including sociology, history, psychology and social psychology, media/cultural studies, philosophy and neuroscience. [The literature reviewed is detailed in the Bibliography at the end of this document].

Two conceptual categories emerged from the literature and proved useful in further analysing the sample. These were a) the specific critique of the ‘first three years movement’ and its claims about parenting and b) the wider critique of ‘neuroscientism’ with specific reference to claims about infant brain development. (See footnote [2] for an explanation of these categories). The analysis then focused on identifying the grounds on which neuroscientific evidence claims have been challenged and the ways in which the policy orientation towards the early years has been problematised.

3. Historical literature: the ‘child saving movement’

The intention of this part of the study was not to produce an exhaustive review of the historical literature on childhood but rather to gain an overview of previous ideological constructions of the parent-child relationship as a problem requiring political attention. The period from the mid-eighteenth century to the present day was focussed on to identify particular historical moments when the early years and the quality of parental nurture became the object of political concern. The search took as its starting point eight texts on the history of modern

childhood. From these, four themes were identified as resonating with the contemporary argument for brain-based early intervention: ‘child saving’; the ‘scientisation’ of motherhood; the intergenerational transmission of ‘cycles of harm’; and ‘parental determinism’. These themes were then explored further through more specific literature. [The literature reviewed is detailed in the Bibliography at the end of this document].

Findings

1. Early intervention and neuroscience: A cause in search of an argument

As indicated above, claims about the developing brain have become widespread in policy documents. However, the analysis showed that concern with parental behaviour - with ‘nurture’ - was well-established *before* the emergence of brain claims in the British context. The first direct reference to the brain found in the sample of policy documents reviewed was in the 2003 ‘Birth to Three Matters’ literature review, published by the Department for Education and Skills. In contrast, the term ‘parenting’ was found frequently across the whole sample. ‘Parenting’ occurred as a term used a total of 1566 times in the documents analysed (‘brain’ occurred 396 times). A closer examination of the way it was used, paying attention to the use of ‘parenting’ as a prefix to other terms, revealed the following:

- **‘Parenting’ is discussed directly as a problem.** In this usage of the term, ‘Parenting’ was constructed as a problem in need of solutions. For example, the terms used in conjunction with ‘parenting’ were: *Parenting support; Parenting order; Parenting intervention; Parenting issues; Parenting programmes; Parenting intervention.*
- **‘Parenting’ as a skill.** ‘Parenting’ used in this way denoted a particular activity or set of practices which can be evaluated and improved. The terms used in this way were: *Parenting style; Parenting skills; Parenting competencies; Parenting strategy; Parenting capacity; Parenting objectives.*

- **‘Parenting’ in partnership with experts.** ‘Parenting’ was discussed as an activity subject to expert knowledge. For example: *Parenting education; Parenting facilitators; Parenting classes; Parenting Institute; The Science of Parenting; Parenting guides.*

The depiction of British parenting as deficient or problematic in this way was thus found to be a consistent feature of the documents reviewed. While differing degrees of negativity about the state of contemporary family life were evident in the documents, as they were produced by parties and think-tanks across the political spectrum, it was very apparent that a consensus had clearly formed from 1997 onwards around the idea of a ‘parenting deficit’. The strongly held view was that raising children is both very difficult and of paramount importance to not just individual families, but to society in general. It was evident that ‘parenting’ had been politicised.

This finding accords with arguments made in the academic social policy literature which identifies a broad shift from an ‘implicit’ to an ‘explicit’ family policy. Emphasis has been placed on the importance of the disappearance of a traditional British ‘reluctance’ in regards to policy making about the family, and its replacement with more overt agendas seeking to address perceived problems of family life. The period of new Labour Government (1997-2010) has been identified elsewhere as constituting a watershed in changing the nature of policy in this respect [3]. Our analysis suggests similarly that the problematisation of parenting and the demand that policy attention be turned towards the inner workings of the family were established in Britain well *before* claims that ‘new evidence from neuroscience’ proves the primacy of parental influence on the infant brain, were deployed.

In this respect, the ‘cause’ – intervening in the early years to influence ‘parenting’– can be said to have manifestly established itself in policy thinking before the ‘argument’ – neuroscientific evidence that the early years are ‘critical’ – was made by policy-makers. The first three years movement can be said to represent the concentration of the prior anxiety about the quality of intimate, intergenerational relationships between parents and children, into the visible, biological form of the brain.

2. Infant neuroscientism: The repetition of questionable claims

What emerged from our analysis of the 24 policy documents which contain references to the brain, and from the review of literature produced in response to ‘the first three years movement’, was a significant disjuncture between the strength of the claims made in policy circles, and the already existing and developed critical analysis of these claims. Only in the first document to contain brain claims, the 2003 ‘Birth to Three Matters’ literature review mentioned earlier, was there any reference to sceptical or critical views. This report accurately reports Professor John Bruer’s challenges to the claims that brain research has produced ‘new evidence’ about the significance of the early years (p116) and that the first three years of life are critical to brain development (p119). The subsequent 23 documents, while repeating many claims from the earlier US ‘first three years’ campaigning, failed to acknowledge that there was a well-publicised contestation over such brain claims in the US [4]. Instead, brain claims tended to be made in increasingly simplified terms, often with no citations of the scientific literature from which they draw authority, leading us to identify this as ‘neuroscientism’, not ‘neuroscience’ [5].

According to John Bruer’s book *The Myth of the First Three Years* (1999), which traced the emergence and development of the ‘first three years movement’ in the US, and contrasted its claims with a review of the scientific literature on brain development, the most-repeated claims about the early years describe the brain as undergoing a ‘synaptical explosion’, during a ‘critical period’ of growth which requires stimulation from ‘enriched environments’. Despite critique from Bruer and others, these claims were evident in English documents from 2003 onwards, as can be seen in the quotations below, taken from the policy documents in the sample.

- **Early brain development is characterised by an explosion of synaptical growth.**

By the age of 3, the young child has around twice the number of neurons of an adult – making the early years critical for the development of the brain, language, social, emotional and motor skills.

(2010 ‘Healthy Lives, Healthy People’, p18. No source cited for the claim)

Children’s brains develop faster in the first two years than at any other stage and they learn more quickly.

(2007 ‘Children’s Plan 0-7 Expert Group Report’, p10. No source cited for claim)

'Synaptic growth' is interpreted by the 'first three years movement' to mean that the early years represent a 'use it or lose it' opportunity to shape infant brains. Many scientists have disputed these claims to truth, however, arguing that more synapses do not mean more brain power; increased dendritic density occurs at any age; and that only certain areas of the brain show increased synaptic density during the early years.

- **Early brain development is characterised by 'critical periods'.**

Recent research in neuroscience also shows that the first three years of a child's life are critical in terms of the development of the brain's capacity to learn both cognitive and social and emotional skills...

(2007 'Policy Review of Children and Young People', p14. Source cited for claim: 'The importance of caregiver-child interactions for the survival and healthy development of young children – A review', World Health Organization, 2004)

Critics of the 'first three years movement' contend that while aspects of language acquisition and visual development are particularly rooted in the early years, neuroscientists agree that critical periods are the exception, not the norm in the development of other human faculties.

- **Babies' brains require particular attention to providing stimulating environments for normal development to occur.**

Many parents are doing a brilliant job, but in some homes the child is strapped in a pushchair and pointed at a blank wall during those precious, irreplaceable first two or three years. It is a wasted opportunity, for which they and we pay the price over successive years.

(2008 'Early Intervention', First Edition, p111. No source cited for the claim)

Evidence on neurological development shows how babies build connections in their brain which enable the development of speech and language, self-confidence and good relationships with other children and adults...It is imperative that children's healthy development in their first years of life is supported...Parents are informed about the importance of talking to their child and following the child's lead in their physical play whilst developing the parents' understanding of brain development.

(2011 'The Early Years: Foundations for life, health and learning', p21. No source cited for claim)

While there is evidence that extremely deprived environments (such as those, notoriously, revealed in Romanian orphanages) experienced in infancy can permanently impair brain development, studies show that even children raised in these conditions could improve when removed from them and cared for in more normal conditions of family life. The massive historical and global variation in child rearing practices indicates that normal human brains develop in essentially ‘ordinary’ environments, which are sufficient to stimulate brain development. There is no evidence to suggest that increased stimulation increases brain capacity.

By comparing the claims made in English policy documents with those made by the earlier US ‘first three years movement’, and by holding them up against the already existing scientific critique of such claims, we can conclude that there is little ‘new’ about the brain claims currently in circulation in England. It is also evident that their attachment to scientific method and evidence is largely rhetorical, with the vulnerable infant brain serving primarily as a metaphor for a prior anxiety about the potentially harmful influence of parents. This metaphorical deployment of claims about brain development is explicitly evident here:

Pregnancy, birth and the first 24 months can be tough for every mother and father, and some parents may find it hard to provide the care and attention their baby needs. But it can also be a chance to affect great change, as pregnancy and the birth of a baby is a critical ‘window of opportunity’ when parents are especially receptive to offers of advice and support.

(2013 ‘The 1001 Critical Days’ p5.)

While the idea of the early years as a ‘critical window’ usually connotes a claimed (but as we see above, disputed) biological fact of brain development, here it is *the parents* who must be opened up to external influence during the ‘critical period’ of the early years of their baby’s life.

3. The dramatization of ‘nurture’

In addition to the repetition of old claims, the study identified some new features in English brain claims-making. Whereas many people are familiar with the commercial exploitation of

brain claims to market baby toys promising the creation of ‘Baby Einsteins’ or ‘Baby Mozarts’, in the English policy context, there has been little emphasis on raising smarter babies. It is a curious feature of this neuroscientific claims-making that it tends not to recommend high-tech or medical interventions. Instead, the singular focus is on programmes of parental education and support which reinterpret very ordinary activities such as talking, singing, cuddling and reading as neurologically critical; in this way ‘nurture’ (and the alleged lack of it) becomes dramatized as having profound consequences for the individual and for society.

Hence, the argument is made that emotional development, shaped by parental nurturing practices and rooted in the structure of the brain, underpins cognitive development. This is achieved through the promotion of a biologized and gender-neutral version of parent-child attachment as the mechanism through which nature (the brain) is nurtured (by parental love). Invocations of attachment theory and the role of cortisol, (the ‘stress hormone’), are here deployed to advocate attentive parenting by both mothers and fathers. This approach implicitly de-normalises the kinds of things which parents already do because they are fun or rewarding expressions of love, by suggesting that a) they do not happen often enough and b) they require the intervention of trained professional to teach parents of their importance. It also constructs ordinarily testing experiences and the ‘emotional ups and downs’ of pregnancy and parenthood as potentially catastrophic. The extracts below illustrate this process of dramatization.

Crying babies

The development of a baby’s brain is affected by the attachment to their parents and analysis of neglected children’s brains has shown that their brain growth is significantly reduced. Where babies are often left to cry, their cortisol levels are increased and this can lead to a permanent increase in stress hormones later in life, which can impact on mental health. Supporting parents during this difficult transition period is crucial to improving outcomes for young children.

(2010 ‘The Foundation Years’, p41. Source cited for claims, Perry, B. (2002)

Childhood experience and the expression of genetic potential: what childhood neglect tells us about nature and nurture. *Brain and Mind* 3: 79–100)

Here we see how an ordinary, expected occurrence – a baby crying – is associated with extremely neglectful care (reminiscent of Romanian orphanages, which are cited frequently in

the sample of documents we analysed). Its consequences are thus constructed as dramatic, permanent, biological and potentially catastrophic. By intensifying the significance of how new parents care for their babies, for the individual child and, it is implied, for society, the case is made for professional intervention in the normal experience of parents learning how to respond to their baby's needs.

Pregnancy and maternal mood

In the following quotation, we can see another significant development in brain-claiming – the claim that the mother's emotional state *during pregnancy* is potentially harmful to the brain of the developing fetus:

The CHPP [Child Health Promotion Programme] needs to reflect new evidence that has emerged about neurological development and the importance of forming a strong child– parent attachment in the first years of life. It should also incorporate the information that we have about the adverse effect that maternal anxiety and depression in pregnancy can have on child development. A child's brain develops rapidly in the first two years of life, and is influenced by the emotional and physical environment as well as by genetic factors. Early interactions directly affect the way the brain is wired, and early relationships set the 'thermostat' for later control of the stress response. This all underlines the significance of pregnancy and the first years of life, and the need for mothers and fathers to be supported during this time.

(2008 'Child Health Promotion Programme: Pregnancy and the First Five Years of Life', p9. No source cited for claim)

It may not seem obvious that the emotions of pregnant women could impact on the infant brain, but evidence-claims are increasingly made that maternal stress and depression produce chemicals which inhibit healthy fetal brain development. Health professionals are therefore now trained in the significance of parental behaviour for healthy infant brains from conception onwards:

A child's experience and environment – both in the womb and in early life – lay the foundation for life. Mothers and fathers are the most important influences on a child's well-being and development. Loving, caring and secure parenting, as well as good nutrition and protection from toxic substances such as tobacco, are essential for a child's growth, well-being and development. These factors have a direct and lasting impact on a child's physical development (particularly neurological development) and on his or her

future health, learning and behaviour (see Part 2). In recent years, advances in neuroscience have increased our understanding of the links between early brain development and later life outcomes, and have shown the importance of providing very young children with consistent, positive and loving care.

(2011 'Preparation for birth and beyond: A resource pack'. Section 2/4/29. No source cited for claim)

Overall, our study indicates that claims of this kind reinforce pre-existing ideas of early infancy being determinate of future life chances but also confirm the construction of the parent as the key mechanism through which this determinism is leveraged on the individual child, for good and for bad. This instrumental, biologised way of thinking about family life also expands and intensifies the obligations of parents to new levels. If parents are, as it is sometimes claimed, 'the architects' of their children's brains, and children's brains form the future of society, then there can be no defence against efforts by government to protect those brains from harm. Why, after all, would a conscientious, loving parent refuse 'support' and risk harming their child's brain?

4. Continuity and change in official concerns: Old wine in new bottles?

Our review of historical literature about the late 19th and early 20th centuries drew out clear resonances between contemporary demands for early intervention and those of earlier incarnations of the child-saving/parenting improving imperative. Previous periods of intense political concern with the quality of parenting (such as the anxiety about motherly instincts in the late 19th century) were also periods of anxiety about rapid social change, concern for the proliferation of the 'wrong sort of people' and a view of the child as the key to future progress or degeneration.

Inevitably, the social project to rescue the child from inadequate parenting produces contestations over the legitimate authority of parents relative to the state. Earlier incarnations of scientific expertise, in the form of medicine, hygiene and psychology, were deployed to defuse this conflict in much the same way that the novelty of neuroscience today is exploited to

make the case for early intervention and parent training. In this regard, research confirmed our suspicion that current brain claims could be considered to be ‘old wine in new bottles’.

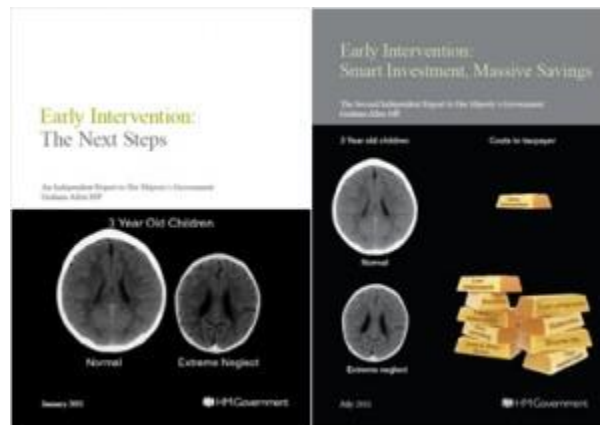
However, what can be said to be new in the recent period is an intensified focus on intimate interactions between the parent and child (such as feeding, touch, speaking), together with a dramatized focus on maternal mood and emotion, bringing with it an expanded concern with the practices of a larger proportion of the parenting population. This has occurred to the extent that the universal provision of advice and support is argued for, and demands are even made for all children to be taught ‘brain-based parenting’ as part of the school curriculum.

Social movements which biologised notions of social progress in previous historical periods argued unapologetically for intervening in childhood to strengthen the national ‘race’. What is new today in the invocation of biology is that the concern appears to be more with the capacity of those who ‘nurture’ to ensure the proper development of ‘nature’. In contemporary brain claiming, the overriding importance of the infant brain rests in the belief that it is biologically determinate of the future adult. But while it is argued that the brain is essentially ‘fixed’ in early childhood, the window of ‘plasticity’ present in the early years is conceptually even more important, as it is this which is mobilized to make the case for early intervention and parent training.

In the present period, we can see that the apparent biologization of the child’s needs is not paralleled in a naturalization of a parent’s ability to meet them. Whereas in the 1950s and 1960s, figures such as John Bowlby posited that attachment was a natural instinct in all babies and most mothers, given the right conditions, and later, 1970s biologised theories of attachment claimed that bonding was driven by hormones, today’s neuroscientific-based theories see attachment as a much less natural or reliable occurrence. Whereas Bowlby predicted attachment problems in some mothers, early intervention policy is driven by the imperative to monitor all mothers. Nature is therefore not inherently functional, but must be nurtured through the encouragement of particular practices and the guidance of ‘neuroscientifically–informed’ experts.

Footnotes

[1] Front covers of documents commissioned by HM Government, authored by Graham Allen MP (published 2011).



Details of the work of the Early Intervention Foundation can be found at: <http://www.earlyinterventionfoundation.org.uk/>

[2] Thornton (2011) uses the term the ‘first three years movement’ to capture the alliance of child welfare advocates and politicians which draws authority from the wider excitement about neuroscience to argue that social problems are best addressed through ‘early intervention’ programmes to protect or enhance emotional and cognitive aspects of children’s brain development. Tallis (2011) makes a helpful distinction between *neuroscience*, which has brought real insights to our understanding of brain function and dysfunction, and *neuroscientism*, which is an ideological attempt to discover the essence of humanity in the brain.

[3] See work by Karen Clarke for a fuller discussion of the shift from ‘implicit’ to ‘explicit’ family policy.

[4] For a fuller description of the US discussion of the ‘first three years movement’, see John T. Bruer’s special briefing paper, ‘Revisiting “The Myth of the First Three Years”’, written to accompany the Centre for Parenting Culture Studies event *Monitoring Parents: Science, evidence, experts and the new parenting culture*. University of Kent, 13-14 September 2011.

<http://blogs.kent.ac.uk/parentingculturestudies/files/2011/09/Special-briefing-on-The-Myth.pdf>

[5] See Raymond Tallis's book (2011) *Aping Mankind: Neuromania, Darwinitis and the misrepresentation of humanity*.

Appendix

Policy Documents (n=41)

Date	Title	Publication Details
1998	Supporting Families	Home Office, Consultation Paper
2003	Every Child Matters Green Paper	Consultation Paper presented by Chief Secretary to the Treasury
2003	Every Child Matters Executive Summary	Summary of above
2003	Birth to Three Matters: A Review of the Literature compiled to inform The Framework to Support Children in their Earliest Years	Commissioned by the Department for Education and Skills
2004	Breaking the Cycle	Social Exclusion Unit report
2004	Choosing Health	White Paper, Department of Health
2004	Mental Health and Psychological Wellbeing of children	National Standards Framework for Child and Adolescent Mental Health Services, Department of Health
2004	Every Child Matters –Change for Children	National Framework for Local Authorities following the 2004 Children Act
2004	National Standards Framework Primary Care	National Service Framework, Department of Health
2004	National Standards Framework Maternity Services	National Service Framework, Department of Health
2004	Core Standards, National Service Framework for Children, Young People and Maternity Services	National Service Framework, Department of Health
2004	Support from the start: working with young children and their families to reduce the risks of crime and anti-social behaviour	Research Report for the Department of Education and Skills
2006	Parenting Support Guidance for Local authorities	Official Guidance, Department for Education and Skills

2006	Reaching Out: An Action Plan on Social Exclusion	Government Report setting out a strategy, Cabinet Office
2006	Breakdown Britain: Interim report on the state of the nation	Social Justice Policy Group. Iain Duncan Smith
2007	Aiming High for Children	Government Policy Review, Department of Education and Skills
2007	Children's Plan 0-7 export group report	Report for the Department for Children, Schools and Families
2007	Every Parent Matters	Government Report, Department of Education and Skills
2007	Policy Review of Children and Young People	Discussion Paper, Department of Education and Skills
2007	Maternity Matters	Government Report, Department of Health in relation to National Standards
2007	Reaching Out Think Family	Risk Review, Social Exclusion Taskforce, Cabinet Office
2007	Breakthrough Britain: Ending the costs of social breakdown.	Policy recommendations to the Conservative Party. Social Justice Policy Group. Iain Duncan Smith
2008	Early Intervention: Good Parents, Great Kids, Better Citizens (1 st ed).	Report from Centre for Social Justice (an Independent think tank) but authored by two Members of Parliament (MP)
2008	The Child Health Promotion Programme Pregnancy and the first five years of life.	Best Practice Guidance, National Standards Framework, Department of Health
2008	The Child Health Promotion Programme Update	Update of Standard One, National Standards Framework, Department of Health
2009	Early Intervention: Good Parents, Great Kids, Better Citizens (2nd ed).	Report from Centre for Social Justice (an Independent think tank) authored by Graham Allen MP and Iain Duncan Smith MP
2010	Early Intervention Securing Good Outcomes	Report, Department for Children, Schools and Families
2010	Healthy Lives, Healthy People: Our	White Paper, Government policy

	Strategy for Public health in England	
2010	The Foundation Years: Preventing Poor Children becoming Poor Adults: An Independent Report on Poverty and Life Chances	Independent Report for the Prime Minister, authored by Frank Field MP
2010	The Marmott Review: Fair Society, Healthy Lives.	Independent review requested by the Secretary of State for Health in 2008.
2010	Sure Start Evaluation	Independent Report for the Department of Education
2010	Support for all	Green Paper, Government Consultation Document
2011	Opening Doors: Breaking Barriers: A strategy for Social Mobility	Strategy Document, Cabinet Office & Office of the Deputy Prime Minister
2011	Supporting Families in the Foundation years	Strategy Document for Service Commissioners, Department of Education and Health
2011	Families in the Foundation years	References and research links to support above
2011	Early Intervention: the Next Steps.	Independent Report for Government, authored by an Graham Allen MP
2011	Early Intervention: Smart Investment	Independent Report for Government, authored by Graham Allen MP
2011	Healthy Lives consultation responses	Summary of responses to the consultations on strategy for public health, Department of Health
2011	Preparation for Birth and beyond: A resource pack	A resource pack for leaders of community groups and activities, National Health Service
2011	The Early Years: Foundations for life, health and learning.	An Independent Report on the Early Years Foundation Stage to HM Government. Dame Clare Tickell. Crown copyright.
2012	Opening Doors, Breaking Barriers: A Strategy for Social Mobility Update	Update on progress, see above

BIBLIOGRAPHY OF LITERATURE REVIEWED FOR THE STUDY

Apple, R. D. 1995. 'Constructing Mothers: Scientific Motherhood in the Nineteenth and Twentieth Centuries' *Social History of Medicine* 8(2), 161-178.

Apple, R.D. 2006. *Perfect Motherhood: Science and childrearing in America*. New Brunswick, New Jersey and London: Rutgers University Press and London: Rutgers University Press.

Ariès, P. 1962. *Centuries of Childhood: A social history of family life*. New York: Vintage Books.

Arnup, K. 1994. *Education for Motherhood, advice for mothers in twentieth-century Canada*. Toronto: University of Toronto Press.

Bangerter, A. and Heath, C. 2004. 'The Mozart effect: Tracking the evolution of a scientific legend' *British Journal of Social Psychology*, 43: 605-623.

Beaulieu, A. 2001. 'Voxels in the brain: Neuroscience, informatics and changing notions of objectivity' *Social Studies of Science* 31 (5): 635-680.

Beck, D.M. 2010. 'The Appeal of the Brain in the Popular Press' *Perspectives on Psychological Science* 5(6): 762-766.

Blakemore, S.J. and Frith, U. 2000. *Report on the implications of recent developments in neuroscience for research on teaching and learning*. (Consultation paper commissioned by the Teaching and Learning Research Programme, ESRC).

Bruer, J. T. 1997. 'Education and the Brain: A bridge too far.' *Educational Researcher* 26: 4-16.

Bruer J.T. 1998. 'Brain science, brain fiction.' *Educational Leadership* 56(3) 14-18.

Bruer J.T. 1998. 'Time for Critical Thinking'. *Public Health Reports* 113(5) 389-97.

Bruer, J.T. 1999. *The Myth of the First Three Years, A New Understanding of Early Brain Development and Lifelong Learning*. New York: The Free Press.

Bruer J.T. 1999. 'In search of brain-based education.' *Phi-Delta Kappan* 80(9): 649-57.

Casteneda, C. 2002. *Figurations: Child, Bodies, Worlds*. Durham and London: Duke University Press.

Churchill, H. and Clarke, K. 2009. 'Investing in Parenting Education: A Critical Review of Policy and Provision in England' *Social Policy and Society* 9(1): 39-53.

Clarke, K. 2006. 'Childhood, parenting and early intervention: A critical examination of the Sure Start national programme' *Critical Social Policy* 26: 699-721.

Clarke, K. 2007. 'New Labour: family policy and gender'. In Annesley, C. and Gains F. (eds.) *Women and New Labour*. Polity Press.

Connors, C.M. and Singh, I. 2009. 'What We Should Really Worry About in Pediatric Functional Magnetic Resonance Imaging (fMRI)' *The American Journal of Bioethics-Neuroscience* 9(1): 16-18

Dumit, J. 2004. *Picturing Personhood: Brain scans and biomedical identity*. Princeton, NJ: Princeton University Press.

Edwards, R., Gillies, V. and Horsley, N. 2013. 'Rescuing Billy Elliot's Brain: Neuroscience and Early Intervention'. Paper given at BRAIN SCIENCE AND EARLY INTERVENTION: joint meeting of the BSA Childhood Study Group and the BSA Families and Relationships Study Group, Goldsmiths University London, 20 June 2013.

https://www.academia.edu/4566784/Rescuing_Billy_Elliots_Brain_Neuroscience_and_Early_Intervention

Ehrenreich, B. and English, D. 1979. *For Her Own Good: 150 years of the experts' advice to women* London: Pluto Press.

Eyer, D. E. 1992. *Mother-Infant Bonding: A Scientific Fiction*. New Haven: Yale University Press.

Featherstone, B., Morris, K. and White, S. 2013. 'A marriage made in hell: early intervention meets child protection.' *British Journal of Social Work*, March 1-15.

Frankenberg, R., Robinson, I., and Delahooke, A., 2000. Countering essentialism in behavioural social sciences: The example of 'the vulnerable child' ethnographically examined. *The Sociological Review* 48 (4), 586–611.

Furedi, F. 2001. *Paranoid Parenting*. London: Allen Lane.

Furedi, F. 2008. *Paranoid parenting: Why ignoring the experts may be best for your child*. London: Continuum.

Gillies, V. 2005. 'Meeting parents' needs? Discourses of 'support' and 'inclusion' in family policy'. *Critical Social Policy* 25(1): 70-90.

Gillies, V. 2008. Perspectives on parenting responsibility: Contextualising values and practices. *Journal of Law and Society* 35 (1), 95–112.

Gillies, V. 2011. 'From Function to Competence: Engaging with the New Politics of Family.' *Sociological Research Online* 16(4)11. <http://www.socresonline.org.uk/16/4/11.html>

Gillies, V. 2013. 'From Baby Brain to Conduct Disorder: The New Determinism in the Classroom.' Paper given at the Gender and Education Association Conference, 25 April 2013. London: London South Bank University.

https://www.academia.edu/3549456/From_Baby_Brain_to_Conduct_Disorder_The_New_Determinism_in_the_Classroom

Goldson, B. and Jamieson, J. 2002. 'Youth Crime, the 'Parenting deficit' and State intervention'. *Youth Justice* 2: 82-99.

Hays, S. 1998. *The Cultural Contradictions of Motherhood*. New Haven and London: Yale University Press.

Hendrick, H. 1994. *Child Welfare: England 1872-1989*. Bristol: The Policy Press

Hendrick, H. 1997. *Children, Childhood and English Society 1880-1990*. Cambridge: Cambridge University Press.

Hill, M., and Tisdall, K. 1997. *Children and Society*. Harlow: Addison Wesley Longman.

Hulbert, A. 2004. *Raising America: Experts, Parents and a Century of Advice About Children*. New York: Vintage Books.

Jensen, T. 2010. 'Warmth and wealth: re-imagining social class in taxonomies of good parenting'. *Studies in the Maternal* 2(1) 2010, www.mamsie.bbk.ac.uk

Jones, S.M. and Zigler, E. 2002. 'The Mozart effect: Not learning from history.' *Applied Developmental Psychology* 23: 355-372.

Kagan, J. 1998. 'The Allure of Infant Determinism.' Pp. 83-151 in *Three Seductive Ideas* (same author). Harvard Mass.: Harvard University Press.

Kanieski, M.A. 2010. 'Securing Attachment: The shifting medicalisation of attachment and attachment disorders.' *Health, Risk and Society* 12(4): 335-344.

Kessen, W. 1979. 'The American Child and Other Cultural Inventions.' *American Psychologist* 34(10): 815-820.

Legrenzi, P. and Umiltà, C. 2011. *Neuromania: On the limits of brain science*. Oxford: Oxford University Press.

Lucas, P.J. 2011. 'Some reflections on the rhetoric of parenting programmes: evidence, theory, and social policy.' *Journal of Family Therapy* 33: 181-198.

Lupton, D.A. 2011. '“The best thing for the baby”: Mothers’ concepts and experiences related to promoting their infants’ health and development.' *Health, Risk & Society* 13(7/8), 637-651.

McCabe, D. P. and Castel, A.D. 2008. 'Seeing is believing: The effect of brain images on judgments of scientific reasoning.' *Cognition* 107(1):343-52.

Meloni, M. 2011. 'Philosophical implications of neuroscience: The space for a critique.' *Subjectivity* 4(3): 298-322.

Miller, G.A. 2010 'Mistreating Psychology in the Decades of the Brain', *Perspectives on Psychological Science*, 5:716.

Nadesan, M. H. 2002. 'Engineering the Entrepreneurial Infant: Brain Science, Infant Development Toys, and Governmentality.' *Cultural Studies* 16(3): 401-432.

O’ Connor, C. and Joffe, H. 2012 'Media representations of early human development: Protecting, feeding and loving the developing brain', *Social Science and Medicine*, 97: 297-306.

O'Connor, C., Rees, G. and Joffe, H. 2012. 'Neuroscience in the Public Sphere', *Neuron* 74 (April 26): 220 -226.

O' Connor, C. and Joffe, H. 2013. 'How has neuroscience affected lay understandings of personhood? A review of the evidence.' *Public Understanding of Science* 22(3): 254-268.

Parton, N. 2006. *Safeguarding Childhood: early intervention and surveillance in a late modern society*. Basingstoke: Palgrave Macmillan.

Parton, N. 2012. 'Reflections on governing the family': the close relationship between child protection and social work in advanced Western societies – the example of England'. *Families, Relationships and Societies* (1)1: 87-101.

Pickersgill, M., Cunningham-Burley, S. and Martin, P. 2011. Constituting neurologic subjects: Neuroscience, subjectivity and the mundane significance of the brain. *Subjectivity* 4(3): 346-365.

Pickersgill, M. 2013. The Social Life of the Brain: Neuroscience in Society. *Current Sociology* 61(1) 322-340.

Platt, A. 1969. 'The Rise of the Child-Saving Movement: A Study in Social Policy and Correctional Reform'. *Annals of the American Academy of Political and Social Science*, 381: 21-38.

Pitts-Taylor, V. 2010. 'The plastic brain: neoliberalism and the neuronal self.' *Health* 14: 635-652.

Poldrack, R.A. 2006. 'Can cognitive processes be inferred from neuroimaging data?' *TRENDS in Cognitive Sciences* 10(2): 59-63.

Poldrack, R.A. 2008. 'The role of fMRI in Cognitive Neuroscience: where do we stand?' *Current Opinion in Neurobiology* 18: 223-227.

Pringle, M. Kellmer. 1974. *The Needs of Children* London: Hutchinson.

Racine, E., Waldman, S., Rosenberg, J. and Illes, J. 2010. 'Contemporary neuroscience in the media', *Social Science and Medicine* 71: 725-733.

Ramaekers, S. and Suissa, J. 2012. *The Claims of Parenting: Reasons, Responsibility and Society*. Dordrecht, Heidelberg, London, New York: Springer.

Romagnoli, A. and Wall, G. 2012. 'I know I'm a good mom': Young, low-income mothers' experiences with risk perception, intensive parenting ideology and parenting education programmes'. *Health, Risk & Society* 14(3): 273-289.

Rose, N. 2010. 'Screen and intervene': governing risky brains'. *History of the Human Sciences* 23(1): 79-105.

Rose, N. and Abi-Rached, J.M. 2013. *Neuro: The New Brain Sciences and the Management of the Mind*. New Jersey and Oxford: Princeton University Press.

Rose, H. and Rose, S. 2012. *Genes, cells and brains: The promethean promises of the new biology*. London and Brooklyn: Verso Books.

Rose, S. 2013 'Grey Matters.' *Times Higher Education*, 12-18 Dec No.2, 131: 36-39.

Rutter, M. 1987. "Continuities and discontinuities from infancy," Pp. 1256-1296 in J.D Osofsky, ed., *Handbook of Infant Development*, 2nd ed. New York: John Wiley.

Rutter, M. 2002. 'Nature, Nurture, and Development: From Evangelism through Science toward Policy and Practice'. *Child Development* 73(1): 1-21.

Satel, S. and Lilienfeld, S.O. 2013. *Brainwashed: The Seductive Appeal of Mindless Neuroscience*. New York: Basic Books.

Segal, E. and Kilty, K. 1998. 'The resurgence of biological determinism'. *Race, Gender & Class*, 5(3) 61-75.

Skolnick Weisberg, Deena, Keil, Frank C., Goodstein, Joshua, Rawson, Elizabeth and Gray, Jeremy R. (2008) The Seductive Allure of Neuroscience Explanations, *Journal of Cognitive Neuroscience* 20: 3, pp.470-477.

Singh, I. 2012. 'Brain talk: power and negotiation in children's discourse about self, brain and behavior.' *Sociology of Health & Illness* 35(6): 813-827.

Smart, C. 1997. 'Wishful Thinking and Harmful Tinkering? Sociological Reflections on Family Policy'. *Journal of Social Policy* 26(3): 301-321.

Smeyers, P. 2008. 'Child-Rearing: On government intervention and the discourse of experts.' *Educational Philosophy and Theory* 40(6): 719-738.

Smeyers, P. 2010. 'State Intervention and the Technologization and Regulation of Parenting'. *Educational Theory* 60(3): 271-284.

Stearns, P.N. 2003. *Anxious Parents: A history of modern childrearing in America* New York and London: New York University Press.

Stearns, P. N. 2011. (Second Edition) *Childhood in World History* London: Routledge.

Story, L. 2003. 'A Head Start in Life?: Prenatal Parenting and the Discourse of Fetal Stimulation. *Atlantis*, 27(2) Spring/Summer.

Tallis, R. 2011. *Aping Mankind: Neuromania, Darwinitis and the misrepresentation of humanity*. Durham: Acumen.

Thompson, R.A. and Nelson, C.A. 2001. 'Developmental science and the media: early brain development.' *American Psychologist*, 56(1): 5-15.

Thornton Johnson, D. 2011. 'Neuroscience, Affect and the Entrepreneurialization of Motherhood.' *Communication and Critical/Cultural Studies*, 8(4): 399-424.

Wall, G. 2004. 'Is your child's brain potential maximized? Mothering in an age of new brain research.' *Atlantis* 28(2): 41 – 50.

Wall, G. 2010. 'Mothers' experiences with intensive parenting and brain development discourse.' *Women's Studies International Forum* 33(3): 253-263.

Wardlaw, J.M. et al "Can it read my mind?" – What do the public and experts think of the current (Mis)uses of neuroimaging? *PLoS ONE* 6(10):e25829.

Wastell, D. and White, S. 2012. 'Blinded by neuroscience: Social policy, the family and the infant brain'. *Families, Relationships and Societies* 1(3): 397-414.

Weisberg, D.S., Keil, F.C., Goodstein, J., Rawson, E. and Gray, J. R. 2008. 'The Seductive Allure of Neuroscience Explanations'. *Journal of Cognitive Neuroscience* 20(3): 470-477.

Welshman, J. 2002. 'The cycle of deprivation and the concept of the underclass'. *Benefits* 35(10), Issue 3: 199-205.

Welshman, J. 2008. 'The Cycle of Deprivation: Myths and Misconceptions'. *Children & Society* 22: 75-85.

Welshman, J. 2010. 'From Head Start to Sure Start: Reflections on Policy Transfer'. *Children & Society*, 24 (2010), 89-99.

Wilson, H. 2002. 'Brain Science, Early Intervention and 'At Risk' Families: Implications for Parents, Professionals and Social Policy.' *Social Policy & Society* 1(3): 191-202.

Wolf, J. 2007. *Is Breast Best? Taking on the breastfeeding experts and the new high stakes of motherhood*. New York: New York University Press.

Yaqub, S. 2002. "Poor Children Grow Into Poor Adults': Harmful Mechanisms or Over-Deterministic Theory?' *Journal of International Development* 14: 1081-1093.