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Brain Science and Early Years Policy: Hopeful Ethos or ‘Cruel Optimism’?

Abstract

Ideas that the quality of parental nurturing and attachment in the first years of a child’s life is formative, hard-wiring their brains for success or failure, are reflected in policy reports from across the political spectrum and in targeted services delivering early intervention. In this article we draw on our research into ‘Brain science and early intervention’, using reviews of key policy literature and interviews with influential advocates of early intervention and with early years practitioners, to critically assess the ramifications and implications of these claims. Rather than the ‘hopeful ethos’ proffered by advocates of the progressive nature of brain science and early intervention, we show that brain claims are justifying gendered, raced and social inequalities, positioning poor mothers as architects of their children’s deprivation.

Keywords: early intervention, infant brain, mothering, neuroscience, social class

WORD COUNT = 7953

Introduction

Ideas that biological mechanisms underlie personal and societal dysfunctions, and that the quality of parental nurturing and attachment in the first years of a child's life are formative, are reflected in reports calling for early intervention from across the political spectrum in the UK. Intervene in this window of opportunity early in a child's life is the message, when synapses are connecting, before it is too late and their brains are hard-wired for anti-social behaviour and failure through poor parenting. Public money is invested in intervention programmes that link the quality of parenting with the architecture of children's brains.

The argument is that these interventions are a positive step towards social mobility for poor children, breaking cycles of deprived brains and deprived circumstances in families, and indeed generally neuroscience has been associated with a transcendent 'hopeful ethos' that challenges neo-liberal rationality. In this article, we critically assess the ramifications and implications of such claims, drawing on our research on the topic. We review the key features of policy reports championing early intervention programmes, with their assertions of the foundational nature of early experiences. We look at how such assertions chime with progressive accounts of how neuroscience offers a view of biology as opportunity rather than destiny, where people can optimise their brains for the betterment of society, as well as warnings about over-claiming and misrepresenting brain claims. We draw on interviews with key proponents of early intervention policies and practitioners working in the early years field to interrogate the way that, rather than a progressive initiative, early intervention using brain science claims essentialises mother-child relations, biologises ideas about cycles of deprivation and reproduces classed value judgments about the means of achieving the 'right sort' of brain development.

Our Research: Brain Science and Early Intervention

Throughout this article, we draw on material from the 'Brain Science and Early Intervention research project'. This study looks at how biologised accounts of the formative impact of early experiences on brain development have come to shape politics, key social policy legislation and early intervention initiatives, as well as the consequences for everyday practices among health care providers and early years educators: www.brainscience.soton.ac.uk.

Towards this aim, our research process included:

- (i) a review of key documents, including policy reports and talks by key advocates in the field that have been influential in shaping and defining political and policy engagement with brain science ideas, especially in relation to early years childrearing and intervention;

- (ii) (ii) semi-structured interviews with four influential public figures who have advocated the application of neuro-scientific concepts in intervention policy and practice: Camila Batmanghelidjh, CEO of Kids Company; Frank Field MP (Lab), author of early intervention reports and Chair of the Foundation Years Action Group; Andrea Leadsom MP (Con), author of relevant reports and Chair of Parent-Infant Partnerships; and Matthew Taylor, CEO of the Royal Society of Arts and former policy advisor to the New Labour Governments. The interviews took place in their offices and focused on the development of their interest in the topic; the sources of their information; their understanding of key and relevant brain science processes; their understanding of the relevance of parenting practices, and the consequences for intervention; and their perceptions of the benefits, limitations and risks of brain science ideas; and
- (iii) (iii) semi-structured interviews with 17 early years practitioners in the south east of England: eight working in the Family Nurse Partnership early intervention programme, seven working in Children’s Centres, and two health visitors. Practitioners were accessed through the supervisors of the services in which they worked. The interviews were carried out in the practitioners’ workplaces and, like the influential proponents, they were asked about the sources of their information; their understanding of key and relevant brain science processes; their understanding of the relevance of parenting practices and the consequences for intervention; and their perceptions of the benefits, limitations and risks of brain science ideas informing intervention.

All participants were provided with information sheets about the project and signed consent forms. The public figures understood that their comments were ‘on the record’. The early years practitioners understood that they would not be identified personally in our written outputs. Given the sensitivities of our analysis, we subsequently negotiated with practitioners that we would not identify the particular localities in which they worked. In recognition of practitioners’ concerns, in some cases we agreed with them that we would only use direct quotes from their interviews that they had already seen.

The literature and transcripts of talks and our audio-recorded interviews were subject to an in-depth discourse analysis, broadly involving close reading of the written text to identify recurring terms, metaphors and references that create and constitute understanding of an issue or set of issues (Gee 2012). We undertook a ‘team-checking’ process, where each of us separately read through an interview to identify these thematic understandings, and then brought our analyses together to identify and discuss overlaps and differences. From this we generated a series of recurrent sets of discursive issues across the whole data set.

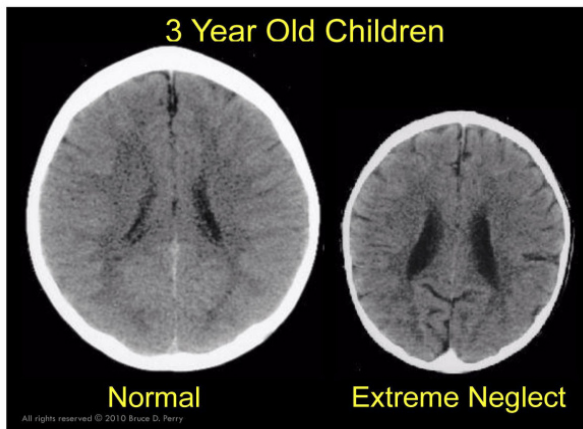
Policies and Programmes

The explicit linking of brain science claims and early years policy and practice came to attention in the late 1990s in the USA (Bruer 1999; Thornton 2011a). In the UK, it

appeared in a joint 'think tank' report from Graham Allen (Labour MP) and Iain Duncan Smith (Conservative MP) in 2008: *Early Intervention: Good Parents. Great Kids. Better Citizens*. This report heralded several of the recurring features of subsequent policy documents arguing for early intervention: its proponents are from across the political spectrum, it asserts the formative importance of attentive parenting (mothering) for babies' brain development and the narrow window available for preventive intervention, it relies on an eclectic mix of sources, and it reproduces an image of a normal and a deprived child's brains taken from Perry (2002). For example:

Scientific discoveries suggest it is nurture rather than nature that plays the leading role in creating the human personality. Physiologically as well as emotionally, infants need a stimulating, accepting environment in which they feel safe and loved. 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. (Allen and Duncan Smith 2008, p. 57)

Figure from Perry (2002):



The joint report was followed by two from Graham Allen, both independent reviews commissioned by the government: *Early Intervention: the Next Steps* (2011a) and *Early Intervention: Smart Investment, Massive Savings* (2011b). The ubiquitous brain images adorned the cover of each report. The first Allen Report set up the case for early intervention because of the damage done to a baby's brain architecture by sub-optimal parenting. Reference was made to how the 'wrong type of parenting and other adverse experiences can have a profound effect on how children are emotionally wired' (2011a, p. xiii). The second report emphasised extensive savings to public spending on social problems such as teenage pregnancy, low attainment, substance abuse and violent crime through investment in early intervention programmes.

In addition to exhibiting the recurrent features instituted by the 2008 Early Intervention report, the Allen Reports display the tendency within such policy-focused output towards a cumulative referencing of previous reports as evidence for the arguments being made. Cross-referencing assertions about the imperative to intervene early to ensure that babies' and children's brains are not damaged by poor parenting and thus prevent poverty and disadvantage are also found in the Field Report's independent review of child poverty and life chances (conducted by the Labour MP Frank Field for the Coalition government) (2010); the CentreForum think tank report on social mobility (2011); the Munro Review of the child protection system (2011); the Tickell review of the Early Years Foundation Stage curriculum; the Department for Education and Family Justice Council commissioned report (Brown and Ward 2012) which puts forward neuroscience-informed 'developmental timeframes' with the aim of guiding court decision making in care proceedings; and the cross-party 'manifesto' *1001 Critical Days* stressing the importance of the period from conception to age two for children's life chances (Leadsom et al. 2013).

The turn towards brain science as an evidence base for early years policy, and the attendant faith in increased returns for a plethora of social concerns, has been used to justify a turn away from universal support services for parents and families towards funding of national and local early interventions services and programmes targeted at disadvantaged communities and families within the postulated crucial ante- and post-natal window of '1001 days'. Examples include the Solihull Approach training system for early years practitioners (<http://www.solihullapproachparenting.com/>), the Family Nurse Partnerships delivering interventions with teenage first-time mothers based on the David Olds Nurse Family Program from the USA (<http://fnp.nhs.uk/> and <http://www.nursefamilypartnership.org/>), and Parent-Infant Partnerships offering psychotherapeutic attachment intervention (<http://www.pipuk.org.uk/>). There is also funding for guidance and advice as to the need for and efficacy of early years intervention programmes, including the 'A Better Start' information resources guiding Big Lottery funding for early intervention projects (<http://www.biglotteryfund.org.uk/betterstart>), and the 'What Works in Early Intervention' Centre, assessing, guiding and advocating intervention initiatives (<http://www.eif.org.uk/>).

In the rest of this article we explore these policy and practice developments further, with a particular eye to whether or not their brain science claims carry hope for addressing social inequalities.

The Rise of the Early Years 'Neuromolecular Gaze'

Ideas about brain science and early intervention resonate with what Joelle Abi-Rached and Nikolas Rose (2010) have referred to as 'the molar management of

human affairs' (p. 32). Underpinning this molar management is what they term the 'neuromolecular gaze' – by which they mean a hybrid style of thought, approach, language and perception that reduces understanding of complex phenomena to a molecular understanding gathered around the brain, and which means that intervention in the brain can shape behaviour. They argue that people are increasingly defined, and attempts made to manage them, in terms of the brain:

We are seeing a concerted attempt, across Europe and North America at least, to argue that the discoveries of these neurosciences hold the key to the management of all manner of human activities and experiences. (*op cit*, p. 32)

In their subsequent book, *Neuro*, Rose and Abi-Rached (2013) build on the notion of neuroscience as a transcending hybrid to put forward what they refer to as a transcendent 'hopeful ethos' associated with new styles of thought in neuroscientific knowledge. Their argument is that the concept of brain plasticity that is a key feature of contemporary neuroscience has the potential to refute biological reductionism and determinism by revealing ongoing mutability through the interaction of biology as brain and environment, and also provides a challenge to mind/brain dualisms. The hopeful ethos of plasticity means that we/society will be able to shape our brains – which are evolved for sociality – through shaping environmental input in good ways, for the betterment of society. This sociality, Rose and Abi-Rached assert, also provides a challenge to the dominant rational neo-liberal ideas of the individual that have driven policy in the late twentieth and early twenty-first centuries

An issue that is left aside in this scenario, however, is the unequal, gendered, raced and classed, environment within which ideas about the brain are engaging; a set of issues that we will consider further in this article. The other side of the coin of the hopeful ethos of taking personal responsibility for our selves for the collective good is the more vindictive ethos of blaming the victims. When Rose and Abi-Rached state that '... we are now acquiring the obligation to take care of our brain – and the brains of our families and children – for the good of each and of all' (2013, p. 223) what we assume to be their collective 'we' is very easily understood as an individualised 'you' where a neo-liberal logic holds sway. The hopeful ethos with respect to 'our' ability to take responsibility for and govern the future rather than be at the mercy of what happens feels a bit naïve to us in that respect. Indeed, Rose and Abi-Rached themselves discuss how neuroscience has latched very easily onto the psychological ideas that are entrenched in how we understand childrearing. Despite their espousal of a hopeful ethos, they refer to the brain as the current mode of objectivity about the development of children. As such it represents the latest incarnation of a longstanding preoccupation dating back to the nineteenth century, which has seen social ills addressed at the level of the child through intervening in and governing inadequate parents and families – a recurring of a strategy that Rose and Abi-Rached note has not had much success (p. 197).

This raises the question of how a version of brain science has gained such influence in the early years. A range of reasons have been identified. In his book *The Myth of the First Three Years*, John Bruer (1999) discusses a number of means by which neuroscience has been and is used, or misused, by early years advocates in the USA

as part of a public relations drive to ensure funding for programmes to help disadvantaged children. In an austere political context where pre-school intervention programmes were regularly criticised for not being effective enough, brain science was mobilised to explain the relatively modest outcomes from large public expenditure. It was argued that such initiatives missed a crucial window of development because they commenced once the child had reached three years old. Instead it was claimed that much earlier intervention was required to capitalise on the rapid synaptic proliferation characterising infancy. As Bruer notes, the assertion of a brain hardwiring cut off point by three-years-old that infuses much policy and practice literature is more determined by the age-range of a service delivery in the USA than it is by neuroscientific fact.

Rose and Abi-Rached argue that a range of conceptual, technological, economic and bio-political 'mutations' have enabled neuroscience to 'leave the laboratory and gain traction in the world outside' (2013, p.9). In addition to the latching of neuro discourses into already embedded psychological ideas, these reasons include the equipment that enables the scanning of brain functions. In themselves, images of the brain such as the one used extensively in early years materials, illustrated in the Figure above, lend credibility to deterministic statements about brain development just by their very presence. These images seem to have a strong hold on the imagination as a concrete representation of the mind and indeed personhood, becoming a cultural icon (Thornton 2011a). Children and people generally are posed as comprised by their brains and parents as rearing the brains. For example, in the interview for our study Frank Field MP described the contrasting child brain scans image as 'a brain that's loved and nurtured and one that isn't'.

Such crude brain science ideas take correlations as causal, with activity in a brain region seen as causing psychological and social processes. The fact that two things are identified as happening together does not automatically mean that one causes the other. That blood flows in one part of a brain are shown as 'lit up' on an fMRI scan does not mean that the rest of it is inactive; indeed the images are not straightforward representations of activity at all. Nor is it straightforward to determine what activity in a region of the brain 'means' or 'causes'. In particular, narrow ideas about rigid critical or sensitive windows of development are over-emphasised, where lack of a certain type of parental stimulation early on in a child's first years are posed as causing permanent stunting of socio-emotional development. This is graphically represented by the shrunken brain element of the image.

Increasingly such over-claiming and misrepresentation of neuroscience has come under challenge, including by neuroscientists, in books, articles and other media (see discussions in Bruer 1999; Rose and Abi-Rached 2013; Schmitz and Höppner 2014; Wastell and White 2013; and blogs such as *The Neurocritic*, *Neuroskeptic* and *Neurobonkers*), pointing out the caveats and lapses in bad assertions and adoptions of neuroscience and in the neuromolecular gaze generally. For example, in an op-ed piece in *The New Yorker* on 'neuroscience fiction', Gary Marcus (2012), a neuro-psychologist at New York University, commented:

Our early-twenty-first century world truly is filled with brain porn, with sloppy reductionist thinking and an unseemly lust for neuroscientific explanations. But the right solution is not to abandon neuroscience altogether, it's to better understand what neuroscience can and cannot tell us, and why.

More specifically, assertions such as windows of opportunity in which children's brains are hard wired by the time they are three or earlier, with how their mother in particular interacts with them being the causal feature in whether and how they develop emotionally and socially, have been challenged. On her DeevyBee blogspot, Oxford Professor of Neurodevelopmental Psychology, Dorothy Bishop, has focused on the erroneous implications of neuromania for parenting and intervention (2011); and tellingly, even the 'leading neuroscientist' Bruce Perryⁱⁱ whose brain image and work is much cited in the independent policy reports, has criticised the assertion that there is a link between the size and development of children's brains, poor parenting and crime (<http://www.theguardian.com/politics/2010/apr/09/iain-duncan-smith-childrens-brains>). It is clear, though, that advocates of the use of brain science in early years intervention find neuroscientific discourse useful.

The Relationship Between Neuroscientific Discourse and Policy

Bruer's (1999) account of the embracing of early years and brain development as a public relations exercise to gain funding alerts us to the issue that rather than brain science driving early years policy, it is a useful rhetorical trope to push or further embed a particular policy direction (and to avoid others: [Edwards et al. 2016](#)). Both policymakers and early years providers acknowledge, respectively, that neuroscience discourse has a role in promoting early intervention policy and in justifying public expenditure on it:

If you're asking to what extent does neuroscience and just neuroscience influence policy I would say in a very very limited way ... there can be a tendency to want to put the neuroscience argument at the front because it's couched in science and, you know we generally speaking believe science has an authority that social sciences doesn't have. (Matthew Taylor)

The reality is our service is expensive. We have to be clear that what we're doing *works* and there's a reason for what we're doing so we have to justify it hugely so it's [got to be] absolutely clear that this early period makes a huge impact to people's whole lives, prison populations, all those sort of things in the future. (Family Nurse Partnership 3: supervisor)

Neuroscience it seems has not necessarily been called upon for its actual explanatory capacity, but for its persuasive value. Several studies have shown that, however irrelevant or plain misleading, 'brain science' information and images lead people to accept assertions (McCabe and Castel 2007; Weisberg et al. 2008). This persuasive power is increasingly being harnessed in the context of constraints on public spending and economic insecurity. Neuroscientific discourse and fMRI scan images are being mobilised to show that psychoanalysis works and deserves funding for example, where the neuromolecular gaze equates the physical brain with the psyche.

The Anna Freud Centre in London uses neuroimaging techniques to demonstrate the beneficial effects of therapeutic intervention, such as Parent-Infant Psychotherapy (<http://www.annafreud.org/pages/the-parent-infant-project.html>). The Kids Company charity runs a 'Peace of Mind' campaign to raise funds (<http://www.kidspeaceofmind.org/>). People can go onto their website, access a virtual brain, donate to purchase a virtual neuron, invite their social networks to do the same, and then the neurons will cluster together in the virtual brain. Camila Batmanghelidjh, their Chief Executive Officer, was clear that neuroscience is good for fundraising in the business sector when we interviewed her.

It is hard to be against what seems to be a hopeful ethos and progressive early intervention. As we now go on to show, however, bad neuroscience and the mis-interpretative rhetorical value of brain science at the policy level has implications for practice, and these are not progressive.

Attaching Biologised Mothers

Early intervention policies and services are often couched in the gender neutral terminology of 'parenting'. Yet early intervention largely is directed at mothers as the core mediators of their children's development. Initiatives usually are delivered through pre- and post-natal care provision in poor communities (e.g. the 'A Better Start' programme provides Area Wellbeing Profiles of developmental outcomes for 0-8 year olds so that intervention programmes can be targeted: <http://betterstart.dartington.org.uk/resources/data/awp/>). Pregnant women and new mothers are targeted. The core significance of mother-child relationships in the early years is underlined through reference to the developing brain and the child's need for an available and responsive primary caregiver.ⁱⁱⁱ The quality of care is claimed to be reflected in the anatomical structure of the child's neural circuits with sensitive mothers producing 'more richly networked brains', as asserted in this quote from *Why Love Matters*, a book by Sue Gerhardt that many of the early years practitioners we interviewed were directed to read as part of their training:

The baby's brain is doing a lot of growing in the first year - it more than doubles in weight. The enormously increased glucose metabolism of the first two years of life, triggered by the baby's biochemical responses to his mother ... Lots of positive experiences early on produce brains with more neuronal connections - more richly networked brains. We have all our neurons at birth, and we don't need to grow any more, but what we do need is to connect them up and make them work for us. With more connections, there is better performance and more ability to use particular areas of the brain. (Gerhardt 2004, p. 42-3)

This notion of the more connections the better is a selective representation, telling half a story. There is no link between synaptic proliferation in infancy and future

performance. Pruning of neurons and synapses also needs to take place in the early years for effective functioning (Inglasias et al. 2005). Moreover, such a biological emphasis embeds and justifies the gendered focus on mothers as naturally better attuned to their infant's needs. The foundations for secure attachment and optimal brain development are traced back to pregnancy, with the prenatal period identified as physiologically and psychologically crucial – both in terms of neural growth of the foetus and the establishment of a healthy attachment bond between mother and child. The rationale for this reflects a reformulation of old and contentious tenets of mother-child attachment theory. Davi Johnson Thornton (2011a & b) argues that ideas about attachment theory have shifted over the past half century as they have keyed into ideas about increasing babies' brain capacity. The original attachment framework prioritised mother-baby bonding as a biologically driven outcome of situations where mothers and babies are together during the early months. In recent years, however, the focus has developed into a stress on mothers needing deliberately to invest time and positive emotional connection in their children as an intense self-managed project – the success of which can be captured in baby brain scan images (McVarish 2014; Wall 2010). It is this particular combination of attachment theory and neuroscience that underpins claims that 40 per cent of British babies are not attached securely to their 'parents' asserted by the Sutton Trust (2014) and repeated by one of the MPs we interviewed – an assertion that has been challenged as full of misunderstandings and misinterpretations of the attachment tests and evidence (Horsley 2014; Meins 2014).

This neuroscientised theme is also played out through a focus on the mother's as well as the child's brain, reflecting an essentialist turn towards viewing sensitive motherhood as biologically determined. Commentators claim that mothers' brains are re-programed during pregnancy, with this article in *Scientific American* being just one example:

The bodily changes of childbearing are obvious, but as we are discovering, the changes in the brain are no less dramatic ... The maternal brain is a formidable object, a singular entity forged by hormones, neurochemicals, and exposure to the ravaging demands and irresistible cuteness of offspring. During pregnancy, the female brain is effectively revving up for the difficult tasks that await ... Among its remarkable changes are those that allow the mother to focus on her infant in the persistent attempt to puzzle out the child's needs and wants. (19 January 2010: <http://www.scientificamerican.com/article/pregnant-brain-as-racecar/>)

The interviews with early years practitioners for our study show that there is also a practice emphasis on the significance of the mother's brain as potentially producing too much of the stress hormone cortisol in pregnancy:

Basically the babies are growing within the womb and actually the chemicals that we put around the baby can influence their brain development. And I tend to talk to the young people about it ... And actually they kind of grasp that and then they try and avoid the stress and the trauma for their child. (Family Nurse Partnership 5);

After birth mothers also needed to protect their baby from biological risk through inattention and/or rearing them in a difficult environment. One practitioner (Family Nurse Practitioner 1) explained how family, housing and other problems could cause mothers stress and thus affect babies' optimal brain development, while another noted:

[There's the] worry about leaving the babies to cry because of all this stuff about cortisol damaging the brain, so that does also influence. You want to give out safe evidence-based practice. (Health Visitor 1)

This concern about cortisol levels positions mothers as in control of their stress reactions, and was expressed through appeals to consider what getting stressed might do to their baby ante and post natally. Practitioners seem to be encouraged to conceptualise stress primarily in terms of relationships rather than pressures associated with disadvantage or lack of resources. Consequently, the advice from practitioners was to avoid arguments, implicitly advocating a submissive position where young women may be at risk of domestic violence (Wiggins et al. 2005).

The link made between attachment theory and brain science has accompanied an explicit gender encoding of early intervention policy. While the default language of 'parenting' continues to frame key literature, detailed accounts now frequently give way to female pronouns and references to mothers. For example, amongst many references, the first Allen Report (2011a) discusses 'the emotions in the exchanges between mother and baby' (p. 13), 'the mother's mental state' (p. 15), 'maternal responsiveness' (p. 16) and 'the bonding of an infant to their mother' (p. 73). The primacy of mother-child relationships is a core principle structuring the everyday work of many early years intervention programmes. Early years practitioners we interviewed who worked with disadvantaged teenage mothers did so with the key aim of strengthening attachment bonds and increasing maternal sensitivity. At the heart of this intervention is the implicit assumption that poverty and disadvantage are personal failings associated with poor parenting. Indeed teenage pregnancy itself could be viewed as evidence of a damaging upbringing:

Everyone has a history, a pattern of something that's happened before. It's not a surprise that these young girls get pregnant. What would be interesting to

see is the baby's outcomes and whether when they're older they make very different choices. (Family Nurse Partnership 6)

The early years practitioners we interviewed were enthusiastic about neuroscience and its application to practice, feeling that it provided strong proof of attachment theory to policy makers, funders and mothers themselves. The Family Nurse Partnership programme require practitioners to raise the subject of brain development in the first visit to the pregnant mother as a way of underlining the crucial significance of participation in the programme and the associated imparted advice. Mothers are provided with a photocopied sheet titled 'How to build your baby's brain' featuring a list of activities claimed to enrich neural connectivity. These include reading books to their babies, singing nursery rhymes, and playing on the floor with them. Practitioners can draw on a variety of creative methods to convey this information. For example, one explained that she gave mothers a dot-to-dot puzzle and called out random numbers to demonstrate the importance of correct brain wiring (Family Nurse Partnership 6), while another spoke of dropping Alker-Seltzer tablets into a glass of water to illustrate how activities fired up new synapses in infant brains (Family Nurse Partnership 2).

Practitioners often viewed their role as helping to break cycles of deprivation by providing a better start for the new baby:

This programme gives [young parents] well researched advice and an opportunity to discuss a different way of parenting this new baby. So just break cycles of behaviour and patterns of behaviour that have grown up within families through generations ... The more we know, the more we understand, the more appropriate support can be given to perhaps try and break what previous generations have, how they've acted. To help the biological processes play out in the way they're meant to when you're doing everything you should have done. (Family Nurse Partnership 4);

Hopefully, if the parent has taken [what you are teaching them] on board, the child will have a chance of succeeding and having that lots and lots of repetition to connect that brain cognitively to what they are doing ... Not everyone is going to have an MRI scan, but I think it would highlight particularly parenting skills and it would reinforce what I was saying that actually if the parents haven't got those skills then the children are never going to gain those skills. (Children's Centre 4)

Despite expressed commitments to work with mothers and their family members, practitioners could portray the parents of their clients as a malign influence, undermining their work and modelling how not to care for babies. One practitioner

referred to the way that she had to work around overpowering family members who thought things should be done in certain ways (Family Nurse Partnership 2), while another was more explicit:

The young mums know what they want, we're just helping them say you can do that. Sadly many a grandparent will say 'you can't, why do you think you can do that then', 'she don't need that then'. (Family Nurse Partnership 6)

The cultural deficit model underpinning early years intervention and the focus on embracing change ensures disadvantaged families are automatically conceptualised in terms of risk, with little consideration given to wider structural and economic factors. This normative promotion of intensive mothering also engrains Eurocentric assumptions, delegitimising alternative values and ways of life. Practitioners saw neuroscience knowledge as justifying more robust interventions, undermining any objections made on the grounds of cultural relativity. Several reflected on how their sensitivities to difference in the past had prevented them from intervening in a way they now know is right. Referring to the brain scan image in the Figure above, a Children's Centre supervisor reflected on how he might have been swayed by lay norms previously but now he and the Centre practitioners were far firmer:

But I think just brain science, that photograph shows to me so much, and it gives me so much passion in what I'm doing ... I think it really gives me that umph to stick by it, rather than just give in to what society might think is okay. So we'll stand by it and give more definite 'this is the right thing to be doing'. (Children's Centre 2)

Brain science training was also posed as revealing the crucial nature of issues that practitioners might have previously overlooked, to underpin intervention:

Often [the mothers] will say things like, 'Oh [my baby] doesn't like me', or I hear all these little things, and I think probably maybe in the past without the knowledge and the training you might not have really recognised the significance of that, and so now I guess it's then asking questions antenatally about 'how do you feel about your baby?'. (Health Visitor 2)

The historical and cultural specificity of parenting can be acknowledged but is made irrelevant in the context of a scientific evidencing of fragility and damage. Yet the version of attachment theory underpinning intervention models relies on a white, Western conception of ideal family life. In many communities across the world childrearing is shared among wide social networks. Kinship care and interdependent households are the norm and exclusive parental care is rare (Otto and Keller 2014). Applying a scientised logic of early intervention positions some cultures at greater risk

of genetic impairment and brain damage simply because of their childrearing practices. The implications of this reasoning range from a sanctioning of culturally insensitive professional practice to a potential resurgence of biologised racism, part of a wider 'molecular reinscription of race' fed by a complex loop between phenotype and social practices related to that phenotype (Duster 2006, p. 427; see also Mansfield and Guthman on epigenetics and new configurations of race and reproduction).

Overcoming Social Class

Embedded in brain science ideas is social class, or rather the overcoming of social class in various ways. The Conservative-led Coalition Prime Minister, David Cameron, has described the realisation of the importance of parenting above socio-economic status as 'one of the most important findings in a generation' (Cameron 2010). In interviews conducted for our study, an MP and a policy advisor each talked about the way that brain science overcomes outmoded ideas about social class as shaping life chances:

[Brain science] breaks the class spell. 'Oh well, we could have done, you know but it's the wretched class system in our country, it's so tightly drawn, you know, there's not much we can do about it'. And the early years studies seem to show that's not true. (Frank Field MP);

When sociologists point out that poor kids have worse life chances than rich kids, is there a danger that people on the Left adopt a kind of crude social determinism ... this kind of crude sociological determinism excused, you know, really an abdication of responsibility for the school to do whatever it could to actually change the destiny of those young people whatever their backgrounds. (Matthew Taylor)

In their, and the views of others of all political colours, brain science overcomes outmoded ideas about social class as shaping life chances. Brain science breaks the class spell and avoids social determinism. Instead a form of biological determinism enables policy makers to endorse and pursue some sorts of policy intervention and to avoid others. They no longer have to bother with ideas about or strategies for redistribution. They can put that aside and focus down on the real, 'molar management of human affairs' issue – how parents bring up their children.

Practitioners operate within this climate, where social mobility and poverty are individualised and brain science discourses are utilised in targeted and commissioned early intervention systems that must prove their worth, to portray mothers' attitudes and behaviour as determining their children's later outcomes. For practitioners, maintaining their professional commitment to making a difference in difficult situations can then mean that they are positioned to see early intervention as able to overcome social class. One of the practitioners we interviewed constructed a 'Billy Elliot' style story^{iv} with a sub-text of damaging working class culture, aspirations and masculinity,

holding back the development of working class infants whose brains would be stimulated if exposed to high culture:

The two young people I saw yesterday. He'd never told anyone but he'd wanted to be a ballet dancer. He didn't dare tell anyone because he would be laughed at, so he took up skateboarding. Which was a sort of halfway house sort of thing. They both love classical music but they'd never dare tell anyone because they'd be laughed at. But actually when they told me I was so excited for them and I said 'you know this is going to help your baby' ... He's damaged his knees too much though to be a ballet dancer with his skateboarding so that's a shame. But he's artistic, he's learning to be a tattooist. So he's got art, you know, you can see it in him. But his father didn't want to hear about it, any dancing, wanted football, rugby, that was fine, but any of that other stuff, no don't mention it again. Because he probably did mention it when he was 10, 11, quite bravely. But if his children were allowed to say it in the future aged 10, that would be great wouldn't it? (Family Nurse Partnership 4)

The classical music that the teenage parents secretly love is going to help their baby, presumably in ways that surrounding the child with more commercial, popular music will not. The skateboarding has damaged the young father so that the more desirable and aspirational ballet dancing is now out of the question and, presumably unfortunately, his artistic streak can now only be channeled into tattooing. This 'Billy Elliot' type story hints at the way that, viewed through the neuromolecular gaze of brain science, ideas about what counts as suitable development and as demonstrating the right sort of brain, are not straightforward but in fact reproduce gendered and classed value judgments.

The story also raises another means by which neuromolecular brain science ideas have gained influence. They resonate with neo-liberal ideas about control over individual destiny in a precarious social world, and what middle class parents can do to counter the ever-present fear of their children slipping into downward social mobility. As both Bruer (1999) and Thornton (2011b) note, as soon as early years intervention advocates in the USA promoted the first three years of life as critical for brain development, middle class parents became consumers of brain-based products and activities that would help their children to achieve educationally (which then left them even more anxious). By virtue of being middle class, parents are posed as having acted to achieve and sustain their children's middle classness (just as their own parents did for them). It then follows that what is middle class childrearing practice is good childrearing practice. Parental behaviour that is going to ensure the brain architecture that promotes or retains social mobility for middle class children must surely result in social mobility for working class children. This is the logic behind assertions in the introduction to the CentreForum liberal think tank report, *Parenting Matters: Early Years and Social Mobility* (2011, p. 5):

The paper will outline the key scientific concepts behind the development of early brain architecture and skill formation and identify the crucial challenge these present to the desire to improve social mobility. It will argue that these concepts create the imperative for greater efforts at intervention directed at the

family sphere to prevent the squandering of individual potential (particularly among children from lower-income backgrounds).

In the early years field, then, rather than a hopeful ethos, the appeal and language of neuroscience is being deployed to produce a deterministic orthodoxy that explains and justifies class inequalities. Indeed, policy and practice is basically arguing that the poor are underdeveloped, that there is something missing in their brains, that they do not experience normal emotions, and most powerfully that they do not love their children like 'we' do. As Graham Allen MP – then Chair of the Early Intervention Foundation – announced to a conference on early intervention attended by practitioners:

... for me early intervention is about giving every baby, child and young person social and emotional capability, you've all got that, you take it for granted, you got it from your parents, you hand it on to your kids, you don't even think about it ... we come across those people, you come across those people ... a lot of people to whom standard parenting skills are unusual. To whom nurture, love and giving a baby interactivity and capability are not things that they did learn themselves. (Westminster Social Policy Forum, 2013, p. 16)

Conclusion

The association of brain development with social mobility resonates with the claim that the 'neuromolecular gaze' transcends the determinism characterising previous biological models of personhood. From this perspective fate is not determined at birth, but is shaped by early social processes that mould the brain. We take issue with Rose and Abi-Rached's reading of the current 'neurofication' of culture as an open and broadly optimistic trend, however, particularly the contention that the plasticity principle of neuroscience largely consigns reductionism and determinism to the past.^v

Rose and Abi-Rached describe how the brain is now regarded as 'optimisable', with biology viewed as opportunity rather than destiny. Definitions of optimum, however, are replete with value judgements as the requisition of neuroscience to authenticate and legitimise a re-traditionalisation of motherhood demonstrates so effectively. Biological discourses around pregnancy and breastfeeding offer an account of the optimal female brain that confirms the primacy of the traditional family, leaving little scope for notions of gender plasticity. In relation to early intervention the focus on brain development is being used to support a simplistic account of socio-economic advantage and disadvantage. Even those early years practitioners who were not delivering targeted intervention programmes and thus not specifically trained in brain science ideas, were aware of them and made easy links between attachment, cycles of deprivation, brain development and children's outcomes.

The current policy preoccupation with the nurturing practices of poor families relies on a meritocratic construction of the wealthy and privileged as having better developed brains. Success is naturalised and unproblematically correlated with brain structure and intelligence. From this perspective the solution to poverty is to make people smarter – children of the poor can then think themselves out of their predicament. Recognition of systematic, structurally engrained inequality merely holds back the power of the individual brain, creating a psychological block that circumscribes achievement and justifies inertia. This is certainly an optimistic standpoint, but it is of a type that Lauren Berlant (2011) has referred to as a 'cruel optimism'. She argues that the social-democratic promises of political and social equality and upward mobility are unachievable fantasies within liberal-capitalist societies that can no longer provide such opportunities. The hopeful discourse of brain science in early years policy is both-devoid of any basis in real experience of hardship, and reinforcing the social inequalities it promises to overcome.

The period identified for critical infant brain development has been increasingly scaled back from an initial starting point of three years. The 'prime window' for development currently is estimated at '1001 days' from early pregnancy, beyond which deficits are portrayed as hard to overcome. In early years policy and practice plasticity is presented as a brief, fleeting opportunity for deliverance before the window of opportunity slams shut. While in the USA brain development was originally commandeered to revalidate early years support services, the use of brain science claims in the UK more often is characterised by causal determinism. Early intervention as a practice is now targeted towards a small minority of deprived families, while the contentions and distorted science framing the doctrine are drawn on more broadly to lend credence to the responsabilisation of poor mothers, positioning them as the architects of their children's poverty and deprivation.

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Endnotes:

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- i The research was funded by The Faraday Institute under its 'Uses and Abuses of Biology' programme. The project received ethical approval from The Faculty of Social and Human Sciences Ethics Committee, University of Southampton.
 - ii Whether or not Dr. Bruce Perry is a 'leading neuroscientist' is subject to question. See Wastell and White (2013).
 - iii There is a silence in the early intervention field about affluent parents whose children may be cared for by unqualified live-in help or sent away to boarding school, and thus may also be judged to be 'insecurely attached'. The neuromolecular gaze of early intervention story of consequent stunted brain development would also apply to them. Nonetheless, such an assertion would be as misleading in its determinism as it is in the case of the parenting of poor, working class mothers.
 - iv A film and then a musical telling the story of a young boy growing up in a mining village during the 1984-5 strike who aspires to be a ballet dancer. Billy's father initially forbids this fearing his son will be considered a 'poof' (gay) but eventually comes around and is supportive, overcoming the dominant narrow version of working class masculinity.
 - v Manfield and Guthman (2014) make a similar argument about how epigenetic models of plastic life may appear to have the potential to eliminate race but rather has ushered in a new form of racialisation based on reproductive processes.