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Targeting brains, producing responsibilities: The use of neuroscience within British social policy



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ABSTRACT

Concepts and findings 'translated' from neuroscientific research are finding their way into UK health and social policy discourse. Critical scholars have begun to analyse how policies tend to 'misuse' the neurosciences and, further, how these discourses produce unwarranted and individualizing effects, rooted in middle-class values and inducing guilt and anxiety. In this article, we extend such work while simultaneously departing from the normative assumptions implied in the concept of 'misuse'. Through a documentary analysis of UK policy reports focused on the early years, adolescence and older adults, we examine how these employ neuroscientific concepts and consequently (re)define responsibility. In the documents analysed, responsibility was produced in three different but intersecting ways: through a focus on optimisation, self-governance, and vulnerability. Our work thereby adds to social scientific examinations of neuroscience in society that show how neurobiological terms and concepts can be used to construct and support a particular imaginary of citizenship and the role of the state. Neuroscience may be leveraged by policy makers in ways that (potentially) reduce the *target* of their intervention to the soma, but do so in order to expand the *outcome* of the intervention to include the enhancement of society writ large. By attending as well to more critical engagements with neuroscience in policy documents, our analysis demonstrates the importance of being mindful of the limits to the deployment of a neurobiological idiom within policy settings. Accordingly, we contribute to increased empirical specificity concerning the impacts and translation of neuroscientific knowledge in contemporary society whilst refusing to take for granted the idea that the neurosciences necessarily have a dominant role (to play).

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1. Introduction

Social policies, the consultation documents that undergird them, and the specific (scientific) discourses employed within these can provide valuable insights into how society and citizens are imagined by the assemblages of actors constituting the state. The psychological sciences especially have long been regarded as central to the governance of post-War 'Western' societies and selves (Rose, 1998). Nikolas Rose in particular has argued how these have been part of a political project within which citizens are governed through their freedoms: they are obliged to take their fate into their own hands and to make a project out of their lives (Rose, 1998; Rose and Miller, 1992). More recently, scholars have argued that the brain sciences are being enrolled in the projects and logics of (self-)governance (Netherland, 2003; Pitts-Taylor, 2010; Rose, 2000; Thornton, 2011a; Vrecko,

2010), making them an important topic for sociological analysis.

Various scholars have taken up this topic, including critics of the use of the neurosciences in social and health policy – especially that targeting the 'early years' (typically years 0–3, although this varies among policy reports) (Featherstone et al., 2013; Macvarish et al., 2014; Wastell and White, 2012). This scholarship describes what the authors tend to term the 'misuse' of neuroscience, for example when policy documents are regarded as drawing far-reaching conclusions from neuroscientific research. It connects with wider work on parenting and on the anxieties produced by policies and cultural narratives in this area. Some scholars then argue that an emphasis on the significance of the developing brain or a health discourse more generally makes parents (usually mothers) feel anxious and guilty for not caring for their children in exactly the 'right' way (Lee, 2008; Thornton, 2011a; Wall, 2004, 2010).

Other social scientists have eschewed the intrinsic normativity of documenting the 'misuse' of neuroscience, taking a more descriptive approach to examining how neuroscientific terms and concepts are used, in which contexts, and to what ends. Such studies around

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neuroscience and identity have shown that in the case of neurological disorders and mental illness, for example, neuroscience is one of several resources mobilised to articulate subjectivities (Bröer and Heerings, 2013; Pickersgill et al., in press; Singh, 2013). The brain sciences, then, are at once evident in a number of realms *whilst also* being sometimes ignored or resisted (Pickersgill, 2013). Narratives of resistance or critique about neuroscience are evident even within science journalism (Whiteley, 2012), which is commonly associated with the propagation of more reductive tropes (Thornton, 2011b). These studies therefore challenge any notion that recourse to a neurobiological idiom necessarily entails an all-pervasive or reductionist ontology.

This paper takes cues from the aforementioned scholarship: it is informed by (and situated within) STS (Science and Technology Studies) literature concerned with the use of (neuro)science, whilst also mindful of the criticisms raised by analysts more explicitly attentive to what they perceive of as *misuses* of neurobiological research. Our focus is on UK social policy documents that are fixed on the early years, adolescence, and later life. Accordingly, we extend previous work that has predominantly focused on the first of these three life stages (Edwards et al., 2013; Macvarish et al., 2013; Macvarish et al., 2014; Wastell and White, 2012). As existing scholarship notes, policy interest in the ‘developing brain’ is considerable; yet, whilst adolescence and older adulthood are also linked in different spheres to the brain (Choudhury et al., 2012; Williams et al., 2012), the origins, incidences and effects of these linkages have largely escaped sociological scrutiny.

Through our central concern with *how* neuroscience is used, we relate our documentary analysis to the broader topic of responsibility, considering how responsibility is (re)defined and, relatedly, how society is imagined in the policy documents inspected. Responsibility was a theme emerging from our analysis and we pay close attention to the way it is (re)defined in these policy documents and through their use of the neurosciences. We engage with the thinking of Michel Foucault and more extensively with that of Nikolas Rose and collaborators to analyse how the neurosciences can be and are employed in order to stimulate certain types of responsibilities for citizens. Our conceptualization of responsibility evokes Foucault’s treatment of power (Foucault, 1978); we conceive of it as a discourse that ebbs and flows, rather than as a stable kind that moves linearly and uniformly from (e.g.) state to citizenry, always existing to a finite and somehow quantifiable degree. Following Rose and Miller (1992), we see the construction of responsibility as one means by which states can ‘govern at a distance’. What these scholars call “advanced liberal democracies” (p. 174) govern through the freedom and responsibilities of active citizens, with the knowledge of experts central to this endeavour. The neurosciences, then, represent one kind of expertise employed in responsabilising citizens. Rose and Abi-Rached (2013) note, for instance, that the neurosciences enjoin people to be responsible for keeping their brains healthy in order to prevent social ills. This speaks to Rose’s (2007) notion of ‘biological citizenship’, aimed at capturing the influence of biology on how citizens come to understand themselves and live their lives, in ways that can be both – and simultaneously – individualising and collectivising. Whilst Rose’s oeuvre is perhaps most associated with the analysis of governance “beyond the state” (Rose and Miller, 1992), the way that citizens and society writ large are imagined within policy documents produced *by and for* the state remains a key point of interest for social scientists. Such texts, we suggest, therefore constitute a relevant site for the investigation of how (and, indeed, if) the neurosciences are leveraged to govern at a distance.

Our contribution in this paper is three-fold: (1) we interrogate a larger body of policy documents than prior scholarship, in particular by extending our analysis to policies concerned with adolescence and older-adulthood; (2) our analysis is animated less by a impetus to critique policy, but more by a desire to understand how (neuro)

science is used in a variety of domains, including policy (hence, our engagements with social theorists like Foucault and Rose are distinct, and therefore so too are our interpretations and conclusions – especially our attention to the diverse, and sometimes highly relational, forms of responsabilisation that take place through policy documents); and (3) we evidence how the neurosciences – and the policies they are sometimes leveraged to support – can be critiqued even by assemblages of policy actors themselves.

In what follows, we outline our methodology before presenting the results in terms of three (overlapping) discursive themes relating to responsibility: optimisation, self-governance, and vulnerability. We evidence their enactment through a neurobiological register in UK policy documents, and in the conclusion reflect on the implications of these findings for broader scholarship on neuroscience and society.

2. Methods

To examine how the neurosciences are being translated into policies aimed at shaping the conduct of families and individuals, we conducted a document analysis of UK policies focussed upon the early years, adolescence and older age. Document sourcing consisted of four stages. First, we searched for documents using Google, limiting the search to the UK with no time limits. Search terms included: ‘neurosciences’, ‘brain’, ‘plasticity’, ‘cognition’, ‘development’, ‘early years’, ‘early intervention’, ‘adolescents’, ‘older adults’, ‘ageing’, and ‘memory’. We undertook a further search on the websites of the UK government Departments of Health and of Education (all publications until 29 January 2014). Reports found were scanned for possible relevance by searching for the term ‘brain’ or ‘neuro’; when these terms were employed the documents were included in our sample. Second, we used references to policies in previously published articles on neuroscience and policy (Edwards et al., 2013; Macvarish et al., 2013; Wastell and White, 2012). Third, we drew on our academic and wider networks to ascertain whether any key documents were missing from our sample. Finally, we used a snowballing strategy, reading the policy documents and websites we found to see if these referred to documents not yet included. In total, 84 documents (and 6 websites) were included in our sample. Of these, 58 explicitly mentioned terms or concepts associated with the neurosciences, or cited neuroscientific literature. The remaining 26 reports included phrases that elsewhere were explicitly linked with the neurosciences, e.g. “crucial foundation years” or “attachment” (and hence served as materials for comparison), or alternatively were documents originating from major organisations (e.g. the Department for Education) or which otherwise featured prominently in the search strategy. These 26 reports do not feature explicitly in this paper, but they were included in our overall sample in order to give additional context to our analysis. The documents were all available on the web, and they were all published between 2000 and 2013. This sampling strategy cannot claim to definitively include all relevant reports; yet, we believe that the most salient materials were included.

Of the documents surveyed, one-quarter focused on children in general and included references to or sections about teenagers. About one-third focused on the early years. One-fifth each of the documents concerned older adulthood or teenagers. The documents differed extensively in terms of their emphases on the neurosciences. In about 20 reports they were not mentioned at all – these reports were more or less spread over the life-course, though proportionately fewer reports focussing on older adulthood mentioned the neurosciences explicitly. Slightly less than half of all the projects made moderate use of the neurosciences, ranging from a few references, to reports in the early years using the neurosciences frequently to justify the emphasis on the first three years in life. Approximately 20 reports used the neurosciences extensively, and these reports could be found across the life-course. (A table detailing all the included reports is available

from the authors upon request.)

Upon reading the documents, Broer made detailed notes when a reference was made to the neurosciences. Initial coding was achieved by copying and pasting selected sections into a separate document. Both authors reviewed the selections, and had a series of discussions within which a coding framework was developed. The initial themes were: optimisation, vulnerability, opportunity, risk, failing, protection/prevention, self-management/self-governance. When analysing these themes further, and in light of the wider literature, we realised that the themes/relevant data could largely be seen as relating, in different ways, to responsibility. For example, 'optimisation' is related to a responsibility of (individual) citizens to optimise their (individual) potential, and themes of 'vulnerability' are often addressed precisely when people are urged to be made responsible for their own or others' vulnerability. We also considered that some of our initial themes made most 'sense' as grouped into larger thematic clusters which contained much of the data that was mapped to the original seven themes. These were, specifically: optimisation, self-governance, and vulnerability. For example, the data associated with the initial theme 'failing' were often also part of the theme 'optimisation', and to a lesser but still significant extent the same goes for the data relating to the 'risk' theme.

In the next section, we examine each of the three themes in turn. Our aim is to produce an interpretative sociological account of how neuroscientific concepts and terms are enrolled in policy documents to legitimate or argue for particular societal practices, and hence configure and responsabilise citizens and social groups.

3. Results

3.1. Optimisation

By 'optimisation' we mean a focus on the practicalities of maximising a broadly-understood human 'potential'. This theme was especially strong within documents regarding the early years. Interventions posited for the early years include nurses visiting (usually disadvantaged) families, reducing stress and improving the health behaviours of pregnant women, and pre-school education. In these (and some other) reports, an implicit or explicit imperative is presented for individuals to meet their potential and to help others achieve theirs.

In particular, suggestions are raised and claims made that children should be brought up, educated and cared for in such a way that they can meet their potential both during childhood and later in life. These can be explicit even in the ways in which 'early intervention' is defined. For example, the so-called 'Allen Report' (specifically: *Early Intervention: The Next Steps*, 2011) – produced by Graham Allen, MP and often taken by social scientists and other scholars to be a hallmark in the UK early years debate (Macvarish et al., 2014; Wastell and White, 2012) – defines early intervention as:

the general approaches, and the specific policies and programmes, which help to give children aged 0–3 the social and emotional bedrock they need to **reach their full potential**; and to those which help older children become the good parents of tomorrow. (p. xiii; emphasis added)

Aside from 'potential', discourses of optimisation were present through the use of terms and notions like 'life chances', or via an economic discourse of capital and investment. An idiom of optimisation especially regarding the early years has been identified by other scholars (Nadesan, 2002; Wall, 2004, 2010); of particular interest here, and which represents the focus hereafter in this section, is how understandings and articulations of 'optimisation'

were produced through a neurobiological register.

This was most evident within Graham Allen's report, which draws on neurologic terms and concepts as one important justification for early intervention. For instance:

An early, growth-promoting environment, with adequate nutrients, free of toxins, and filled with social interactions with an attentive caregiver, prepares the architecture of the developing brain to function optimally in a healthy environment. (*Early Intervention: The Next Steps*, p. 14)

Such phraseology frames the soma as the appropriate target of intervention (Pickersgill, 2009): it is the brain that should function "optimally in a healthy environment", rather than the developing child per se.

Having work and raising happy families is considered important across some of the reports pertaining to the early years. These pro-social achievements – which seek to optimise citizens for a particular (economically productive) vision of society – will, as the 2008 *Early Intervention: Good Parents, Great Kids, Better Citizens* report puts it, help to counter the "intergenerational transmission of disadvantage" (p. 9). This document was produced by The Centre for Social Justice (a think-tank established by Conservative MP Ian Duncan Smith) and The Smith Institute (a broadly left-wing think-tank), with Allen as a co-author. Ultimately, this transmission is presented as occurring through the brain. For example, a paragraph on the process of growth of synapses in the early years ends: "The whole process has the effect of making early learned behaviour resistant to change." (p. 58) Hence, disadvantage and a lack of parenting skills influence a child negatively through impacting synaptic development and consolidating problematic behaviour. Countering the intergenerational transmission of disadvantage is expected to lead to fewer costs to the state, since "[i]f left unchecked, not only could we face a feral future on our streets but the public policy consequences will be massive and will come with a tax bill to bankrupt every taxpayer" (p. 21, 22).

This was not the only report mentioning 'the taxpayer', underscoring the orientation of such reports towards the optimisation of society writ large, even as the reports focus on individuals and families. A striking example of this collapsing together of optimised brains, persons and societies, and the economic logic that underpins this, is a further report by Graham Allen: *Early Intervention: Smart Investment* (2011). This focuses on the financial gains and losses possibly associated with early intervention. Its cover features images of two 'types' of brains: one, the brain of a "normal" child; the other, the brain of one who has experienced "extreme neglect" (p. fci; front cover). Alongside these are gold bars showing how much each brain would 'cost' the taxpayer. Next to the 'normal' brain is a single bar: i.e., the cost incurred through early intervention. Within the terms of the report, though, this 'cost' is really "the most fundamental investment in the human capital of our country" (p. 9). However, the 'neglected' brain is associated with a pile of nine bars, labelled (e.g.) 'teen pregnancy', 'failed relationships', and 'shorter life'. Such negative outcomes affect not only existing citizens, but also have consequences for future generations; most explicitly, through how people with 'neglected' brains will be less able to raise happy families, thereby repeating "the cycle of dysfunction" (p. 5) (see, relatedly, O'Conner and Joffe, 2013). Implicit is the idea that these 'social problems' have measurable financial corollaries, blending together societal and monetary 'costs'. Accordingly, the report contributes to a discourse of optimisation in terms not only of individual (proto-) citizens, but of 'society' more broadly (as a consequence of strategic state investment) and of an imagined future population.

In spite of the orientation towards themes of optimisation in a

range of reports, it is also noteworthy that some documents were more critical towards this discourse – and deployed neurobiological research as a means of problematizing it. For example, *Early Years Learning* (a background briefing for an inquiry into early years education), argues that how the formation of synapses in the brain “relates to later educational learning or to the acquisition of knowledge and skills [...] is unknown” (p. 3). It concludes: “Overall, the research does not support the argument for a selective educational focus specifically on children’s earliest years” (p. 4). Further, “There is no convincing evidence that special enriching environments are advantageous to the development of the child” (p. 12). However, this critique is grounded within a neurologic epistemology as opposed to an explicit political ideology, and hence implicitly advocates for a particular mode of technocratic governing. In so doing, discourses of optimisation per se are not troubled: the scepticism professed focussed on the evidentiary support of current goals-not the goals per se.

A more overtly critical engagement with the political mobilisation of neurobiology appears in the 2010 report, *Issues in Earlier Intervention: Identifying and Supporting Children with Additional Needs*. This was “commissioned by the Department for Children, Schools and Families (DCSF) to provide a more nuanced understanding of concepts such as prevention and early intervention” (among other things) (p. 8). It troubles both the use of neuroscience in policy reports and the consequences of these, citing a

number of researchers and academics [who] have also been critical of the notion of earlier intervention, for example on the basis that it involves increased surveillance of families; [...] or that it places too much emphasis upon individual problems and gives insufficient attention to the social and economic conditions that impact on children’s lives (p. 15; references deleted).

Hence, this report seems to be somewhat wary of political agendas around early intervention more broadly, thereby at least raising the possibility for questioning the ideology underlying some of the other reports concerned with the early years.

Nevertheless, most of the documents pertaining to the early years convey, in more or less explicit ways, that ‘human potential’ both exists and can be optimised through particular policy levers. This discourse is not only focused on individuals, but represents a specific notion of society as well, and of relationships between people. One aspect of this is that people should ideally be as least dependent as possible on ‘the taxpayer’, which is related to a notion of people being able to govern (i.e., to have responsibility for) themselves. This is the second theme in our analysis.

3.2. Self-governance

Whilst discourses of optimisation were most strikingly evident within policy documents pertaining to the early years, the theme of ‘self-governance’ ran across the different life stages considered in this analysis. Data expressing this theme includes, especially, instances where individuals are urged to take care of themselves, or where (e.g.) professionals are enjoined to help people to take care of themselves (i.e., to facilitate self-governance).

In the reports we inspected that took the early years as their focus, for instance, important attributes for (future) citizens involve a capacity to be responsible for themselves and their children, and to personally manage life’s challenges in order that they are not dependent on others – and especially not ‘the taxpayer’. For example, the aforementioned *Early Intervention: The Next Steps* asserts that if children have an underdeveloped cortex they lack “an ‘emotional guardian’” (p. 17). Hence, the basis for self-governance is framed as explicitly located within a child’s brain. By nurturing and

protecting a developing brain, the child in turn will be protected from being too easily swept away by challenges and adversities later in life.

This is closely related to the notion of ‘resilience’, a term circulating widely within UK policy discourse and attached to a variety of ontological kinds (e.g. places, objects, communities, individual psychology) where ‘threats’ are constructed and argued to be in need of guarding against (MacKinnon and Derickson, 2013). The concept of ‘resilience’ was often shaped through a neurobiological register in the reports we inspected. In the 2012 Annual Report of the Chief Medical Officer, *Our Children Deserve Better: Prevention Days* (2013), resilience is defined as:

the term used to describe the relative resistance that can be shown by the brain to psychosocial risk experiences. [...] Put simply, ‘it is the capacity to resist or bounce back from adversity’. It is the ability to overcome stressful insults or to experience a relatively good outcome despite exposure to situations or insults that create negative effects in others. (p. 38; footnotes deleted)

Resilience, then, is about overcoming stressful events and bouncing back from adversity – and, importantly for our analysis, its most fundamental ontology seemed ascribed to the brain itself, as vividly illustrated in a 2011 report from the Department of Education:

Mentally tough individuals – those with a high ability to cope with challenges and operate at peak performance levels – have a greater volume of grey matter tissue in the right frontal lobe, an area of the brain associated with strategic thinking and problem solving, and the precuneus, involved in the sense of self and one’s capabilities. (*Positive for Youth Discussion Paper: Adolescent Brain Development*, p. 5, 6)

Whilst this document does not directly infer causal relationships between individuals’ brains and traits, it does frame ‘mental toughness’ as having cerebral underpinnings, and further presents this quality as desirable. The later (2011) report *Positive for Youth: A New Approach to Cross-Government Policy for Young People Aged 13 to 19* (which is in part based on this discussion paper, and especially the neurologic themes therein) likewise emphasises the related qualities of resilience and mental toughness. It underscores the value of promoting these in education practice and in youth work, arguing that mental toughness largely determines the abilities of individuals to “deal with challenge, stress and pressure” (p. 34). In effect, a particular cerebral architecture, built in childhood through parenting and education practices, is presented as being a platform upon which good self-governance can be built.

The ideal of self-governance is also visible in how adults are used as contrast points in reports on adolescents, where adult brains are ‘fully matured’ and therefore capable of some of the things that young people are said to struggle with. For example the 2007 Department for Education and Skills report, *Supporting Parents of Teenagers*, argues:

These research findings suggest that changes in the teenage brain result in a temporary, but necessary period of disorganisation. Fortunately, through the appropriate amount of trial and error, most teenagers survive this period of confusion and develop into adults with brains that can make well-informed decisions, retrieve important information, plan future activities and control strong emotions. (p. 34)

Hence, (“most”) adults – or, more specifically, their *brains* – are

able to decide, remember, plan and control well: to govern the self. This way of seeing self-governance is closely related to the way rational decision making is often conceptualised, and through which certain cognitive processes such as making well-informed decisions are idealised as being right and rational. As authors have noted, the ideal in “discourses of adolescent brain development” (Kelly, 2012: 944) is for adolescents to turn into, and hence be compared to, responsible adults (and therefore good citizens) who successfully engage in ‘rational’ decision making.

Self-governance is also a theme present in documents focussing on older adults. The 2008 *Foresight Mental Capital and Wellbeing* report argues, for example, that adults have personal responsibility for health behaviour to “ensure cognitive vitality in later life” (p. 58). It asserts:

It is never too early to adopt a healthy and protective lifestyle – the decline in the brain starts many years before old age. So a key message is for individuals to take a long-term view and not wait until older age before taking action. (p. 200)

In order to “offer protection of mental capital”, individuals should, for instance, take regular exercise (p. 57). Accordingly, self-governance – in the form of disciplining oneself to exercise, eat healthily, and refrain from smoking – is called for in order to protect our brains, ourselves, and, ultimately, our society, from the diverse costs of cognitive decline and dementia. The report thus links to wider societal discourses around neurological change (or damage) (Pickersgill et al., in press), and within which “the ageing process involves a socio-political imperative that we govern ourselves and our bodies in healthful and responsible ways” (Williams et al., 2012: 74; emphasis removed).

Moreover, dementia in particular is seen as a brain disease that limits people’s capacities to govern themselves. This is illustrated clearly in the Nuffield Council on Bioethics’ 2009 report on *Dementia: Ethical issues*:

Much distress, for example, may be caused by disinhibited behaviour on the part of a person with dementia [...] Growing understanding of how such behaviour is linked with damage to the mechanisms in the brain that usually enable people to keep particular thoughts and emotions private will encourage more appropriate responses to such behaviour and help reduce the stress placed on carers. (p. 52; footnotes deleted)

Resonant of calls for ‘brain-based parenting’ (Hughes and Baylin, 2012), such urging of citizens to recalibrate their responses to individuals with dementia enjoins carers to reimagine themselves and their responsibilities: a lack of self-governance (or “disinhibited behaviour”) requires understanding and “appropriate responses”, with an imaginary of the brain of individuals with dementia used to promote these. In the Department of Health 2013 report on *Dementia: A State of the Nation Report on Dementia Care and Support in England*, a neurobiological idiom was also used by a person with dementia who wanted to be treated with respect: “we’re not mad; this is just something that has happened to a part of my brain” (p. 47).

As we have seen, one important attribute of citizens that is emphasised by the authors of a range of reports pertaining to the early years, adolescence, and later life is that of self-governance. Individuals who manifest this capacity are able to control strong emotions, plan ahead, protect their mental capital, and be resilient and mentally tough in the face of life’s challenges. Where young infants (and, to a lesser extent, adolescents) are not seen as able to govern themselves, their caregivers are urged to self-govern in ways that will ensure the development of a (often cerebral)

platform from which children will eventually learn this skill. Moreover, people are seen as primarily responsible for self-governance in such a way as to reduce the chances of dementia and ‘ensure’ cognitive vitality. In cases where dementia has already occurred, carers are encouraged to govern their own affects and cognitive responses.

While the aims and agents of governance are articulated slightly differently depending on the temporal focus of the reports under consideration, they act in concert to weave a narrative of subjects who are closely governed across the life course – who can act responsibly and are optimised for family and civic relationships in the ways discussed in the previous sections. The emphasis of self-governance – indeed, in some cases its ontology – is justified and constructed in part through recourse to a neurobiological imaginary (Bessant, 2008; Kelly, 2012; Netherland, 2003; Vrecko, 2010).

3.3. Vulnerability

If themes of ‘optimisation’ and ‘self-governance’ speak directly to an overarching discourse of responsibility, the language of ‘vulnerability’ – which plays a key role in UK social policy (Brown, 2012) – contributes to this in more subtle ways. Whilst an idiom of vulnerability might seem to denote ‘irresponsibility’, it simultaneously evokes responsibility by enjoining an awareness of one’s own, or others’, vulnerability, and thereby presents citizens with responsibilities for guarding against or reducing this (see for a related argument: Biebricher, 2011). A variety of entities (cerebral matter, individuals, families) were put forward as being in some sense ‘vulnerable’ in the reports considered. The way vulnerability is constructed as relating to neurobiology is our focus in the remainder of this section.

In the aforementioned *Dementia: Ethical Issues* report, people with dementia are described as “inherently vulnerable” (p. xxv), including to abuse from carers, with “the direct cause of their symptoms [being] the progressive damage to the brain” (p. xxi). Whereas people with dementia are not often referred to explicitly as vulnerable, when they are this is seen as an inherent and unchangeable property. In contrast, in the early years vulnerability is most often a future possibility that can be prevented with the right interventions. Indeed, the professed goal of early intervention is commonly to make children less vulnerable in later life, by acting on their brain at a young age. The 2008 *Foresight Mental Capital and Wellbeing* report (discussed above) states:

The mother’s health during pregnancy (physical health, stress, nutrition and substance use) and the quality of nurturing that the infant and young child receives programme the brain biology of the developing child, making the child more or less vulnerable to stress, mental health disorders and physical diseases later in life. (p. 63)

When considered in the broader context of early years reports, such statements about vulnerability interact with the themes of optimisation and self-governance explored above, producing a discursive matrix within which particular kinds of infants are configured. Such children have brains that, if not cared for correctly, will result in adolescent and adult subjects who are confronted with more unfavourable life conditions than others and who are less able to cope with them (because of their improperly set cerebral foundations). Children are, in effect, vulnerable to not being resilient.

Where the early years are sometimes described as a ‘window of opportunity’ (to produce resilient subjects), the teenage years are more likely to be depicted as ‘a window of vulnerability’ (a phrase

with wider cultural purchase). The idea of sensitive or even ‘critical’ windows in development is one of the most debated ideas from the psychological sciences used in policies targeting the early years in particular to convey a ‘now or never’ argument in terms of a rationale for raising children ‘well’ (and intervening in their lives when deemed necessary). Associated especially with the work of [John Bowlby](#), ([1969] 1999) and his theories of attachment – but also related to the development of specific abilities like vision and language ([Marco et al.](#), 2011) – policy engagement with critical periods or ‘windows’ today includes interpretations of neuroscientific research. As the aforementioned *Our Children Deserve Better: Prevention Pays* report puts it:

While it is still too early to translate neuroscience into policy interventions, **we are beginning to understand why adolescents are particularly vulnerable to peer influences and why there appears to be a ‘window of vulnerability’ to risky behaviours around ages 14 to 17 years, particularly in the presence of peers.** (p. 154; emphasis in original; footnotes deleted)

Whereas neurobiology is introduced tentatively in this extract, the temporal register invoked (i.e., “too early”) is suggestive of a science that will, one day, be able to speak directly to the hopes and goals of policymakers, and hence be more readily incorporable within practice.

In some of the reports examined, adolescents are constructed as citizens who should be responsible precisely for their vulnerability, and for their lack of capacity to take full responsibility. Here, themes of ‘vulnerability’ and ‘self-governance’ mix together to enjoin the protection of one’s brain – and, hence, of oneself. Frequently encountered and often emphasised within policy documents relating to adolescence were concerns regarding underdeveloped decision-making abilities about the consumption of alcohol. Reflecting wider public concerns about teenagers, adolescents were framed as more prone to take risks like drinking (too much) alcohol – potentially leading to their brains being damaged (especially areas associated with decision-making and long-term memory). The solution seems to be for adolescents and others to understand this situation so as to be able to act responsibly. For example, the 2008 report for the Department for Children, Schools and Families, *Use of Alcohol Among Children and Young People*, argues:

It must be made clear that alcohol does have massively more impact on the body of young people than it does on those of adults and that the foundations of addiction are more easily laid in the brains of young people than of adults. (p. 93)

Teenagers’ parents too are urged to have increased understanding of (the neurobiological basis of) their children’s behaviour and therefore for example to have more patience. *Supporting Parents of Teenagers*, produced in 2007 for the Department for Education and Skills, is – as the name suggests – entirely focused on what it means to be a parent of teenagers and how people can be best supported in this role. Knowledge of brain development is presented as a key mechanism through which this can be achieved. The report gives a detailed description of neurochemical changes and imbalances in the teenage brain, concluding that

it appears as though many of the difficulties associated with the teenage years are related to the biochemical and structural changes that take place during post-pubescent brain development. However, these findings do not suggest that problematic teenage behaviour is simply a result of ‘nature running its course’ and nothing can be done to alter it. Rather, the

neurological findings underscore the importance of ‘nurture’ in determining adolescent outcomes, since learning experiences govern the course of the synaptic pruning process. [...] These facts have widespread implications for educational and social policies, including those that support positive parenting. (p. 35)

Hence, the report presents a broadly ‘environmental’ (“nurture”) narrative of human development that nevertheless foregrounds the role of the brain. This enables the following conclusion to be made: “parents play a particularly important role during this time of child development and [...] quality parenting counts” (p. 164).

The very existence of reports focussing solely and explicitly on adolescents performs cultural work in producing this temporal period as discreet and somehow special. In turn, they resonate with other constructions of a ‘neurological adolescent’ within science and wider culture – even if teenagers themselves may be ambivalent or agonistic to such explanatory models of their personhood ([Choudhury et al.](#), 2012). Such “neural imaginings” ([Buchbinder](#), 2014: 1) are also leveraged to argue for diminished, explicitly criminal, responsibility in teenagers ([Walsh](#), 2011).

In a different yet related way, the 2008 Youth Justice Board report, *A Literature Review into Children Abused and/or Neglected Prior Custody*, cites scholars who argue for the need to “re-invent [...] justice”, since “young offenders” who have experienced maltreatment are “constitutionally more at risk of responding and behaving maladaptively” (p. 44). ‘Constitutionally’ here includes traumatic history and social experiences as well as the biological impact that maltreatment has had. The authors cited in the report furthermore wonder how the law could be fair to these young offenders who behave maladaptively “through no fault of their own” (p. 44). Understanding brain biology therefore (or, rather, understanding this way of understanding brain biology) can lead to pleas for reduced culpability in court for different people. Such a cerebral framing seeks to interfere with legal notions not only of adolescence, but also of justice per se.

To summarise, in this section we have explored how a discourse of vulnerability was one way through which the responsibilities of citizens were construed. This discourse comes back in different ways across the three life-course stages we have focused on. Perhaps surprisingly (see [O’Connor and Joffe](#), 2013), teenagers and their brains are more likely to be explicitly framed as vulnerable than infants. Vulnerability is related to the ‘risky’ behaviour of teenagers but also to the idea that the risks that they take can have more impact on their still developing brains. Whereas infants too are sometimes described as vulnerable, vulnerability is for them more often presented as a problem for the future that can be mitigated against by early intervention; people with dementia, in contrast, are less frequently constructed as vulnerable than adolescents, but when they are, this vulnerability is ‘fixed’ and intrinsic, as opposed to something that might wax and wane through their own agency.

4. Conclusion

Through a documentary analysis of UK policy reports focused on the early years, adolescence and older adulthood, we have analysed how these employ neuroscientific terms and concepts, and what roles such notions play in (re)defining citizen responsibilities. Responsibility was largely produced in three different but intersecting ways: through a focus on optimisation, on self-governance, and on vulnerability. Responsibilities are cast in terms of responsibilities to the self, as well as to others, with the aim of enhancing individuals and communities. Especially in policies focused on the early years,

economic enhancement is one of the main arguments given for intervening in the brain through family and social life. Reports speak of and directly to 'the taxpayer', thereby producing and enrolling a particular sociotechnical imaginary (Jasanoff and Kim, 2009; Pickersgill, 2011; Stephens et al., 2013) to construct and substantiate a vision of society and the technical processes governing it: one within which flows of capital can be anticipated, interpreted and accounted for in terms of their relation to certain kinds of individuals and their amalgamated cost to the state and the individuals (i.e., 'the taxpayers') who finance it. Hence, the reports under consideration construct images of society (and, of course, of the body) through which intervention on the brain 'makes sense'. While neuroscience may be leveraged by policymakers in ways that (potentially) reduce the *target* of their intervention to the soma, however, they do so in order to expand the *outcome* of the intervention to include society writ large.

Overall, the neurologic narratives we describe and the functions they perform – especially regarding the import of relational forms of responsibility – accord with those that Rose (1998) has ascribed to the psy-sciences. These, he argues, represent an "individualizing technology" that "enable(s) one to construe a form of family life, education, or production that simultaneously maximizes the capacities of individuals, their personal contentment, and the efficiency of the institution" (Rose, 1998: 114). Rose has more recently suggested that the neurosciences are beginning to occupy some of the discursive space previously occupied by the psy-sciences (Rose, 2008; Rose and Abi-Rached, 2013). This indeed seems to be the case in many of the documents we inspected. Reports discussing policy across the life course ascribe specific social problems to the functioning of brains, yet the solution that they plea for is often a relational one, where parents have a more loving relationship with their children and understand their teenagers better, and where people care for and understand the behaviour of those with dementia. Through our analysis, inspired by the thinking of theorists such as Foucault and Rose, we have been able to show not just the different and sometimes contrasting ways in which the neurosciences are employed in British social policy, but also how responsibility is a key theme in these policies (even as it comes to take diverse forms). Importantly, this is not solely a responsibility focused on individual self-care, but is also a responsibility often framed in terms of relationships and the degree to which citizens can help others become more responsible (nuancing, therefore, claims that the use of neurosciences for policies lead to a greater individual responsibility; e.g. (Wall, 2004).

The paper also adds further empirical detail to social scientific accounts of neuroscience and society (e.g. Bessant, 2008; Bröer and Heerings, 2013; Choudhury et al., 2012; Kelly, 2012; Nadesan, 2002; Pickersgill, 2013, 2014; Pickersgill et al., in Press; Williams et al., 2012). In particular, it extends scholarship on the early years that has pointed to the dominance of individual optimisation in policy and other discourses around infancy, and the contribution that a neurobiological register makes to these (Nadesan, 2002; O'Connor and Joffe, 2013; Wall, 2004, 2010; Wastell and White, 2012). Analyses of early years policies have focused largely on the most visible reports (e.g. those by Graham Allen), which indeed seem to illustrate the message of individual optimisation in the most expressive ways. However, we have shown that not all reports present this specific message; importantly, some documents even explicitly critique such a discourse – either by questioning the neurobiological evidence or by questioning its underlying ideology. This finding renders problematic any assumptions about the force of neurobiology within policy per se, and is suggestive of the need for further nuanced attention to the place, role and impact of neuroscientific terms and concepts in different policy domains.

Our analysis thus indicates the import of neuroscience to UK

social policies, whilst simultaneously suggesting caveats both for generalising out from particular reports and policy domains, and for assuming that broader societal implications emerge from these. For one, the fact that neuroscientific terms and concepts exist within policy reports does not necessarily imply fundamentally new kinds of social praxis, given the correspondence of the leveraging of neuroscience in policy with the widespread deployment of psychological knowledge in the twentieth century (even if ontologies of self and society are themselves partly recast within policy documents). Further, our findings demonstrate why it remains important to be mindful both of the limits to which a neurobiological idiom is deployed in policy settings (and elsewhere), and of the extent to which critical discourses may proliferate even within the terrain where the terms and concepts of the neurosciences occupy space (see for similar arguments: Bröer and Heerings, 2013; O'Connor and Joffe, 2013; Pickersgill, Martin and Cunningham-Burley, in press; Whiteley, 2012). In so doing, sociological studies can contribute to increased empirical specificity concerning the salience of neuroscientific knowledge whilst refusing to reproduce any notion that the neurosciences have a uniformly dominant role (to play) in contemporary policy and everyday life.

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