

## Adopting neuroscience: parenting, ~~materialities and affect~~ and affective indeterminacy

### Abstract

What happens when neuroscientific knowledges move from laboratories and clinical settings into therapeutic settings concerned with the care of children? 'Brain-based parenting' is a set of discourses and practices emerging at the confluence of attachment theory, neuroscience, psychotherapy and social work. ~~We contrast brain-based parenting with affect theory. We highlight a different mode of relating to neuroscience focused less on the extra-discursive mobility of affects, and more on their regulation, development and blockages.~~ The neuroscientific knowledges in ~~brain-based parenting~~ involved understand affective states such as fear, anger and intimacy as dynamic patterns of coordination between brain localities, as well as flows of biochemical signals ~~through~~ via hormones such as cortisol. Drawing on our own attempts to adopt brain-based parenting, and engaging with various strands and critiques of new materialism and affect theory, we explore the ways in which the social sciences and humanities might fruitfully engage with neuroscientific concepts and affects. ~~suggest that~~ How does science-affected indeterminacy, with all its promises of ontological and experiential agency, ~~poses the problem of how~~ help us to observe, wait, bind or hold together volatile mixtures of habit, speech and action?

**Keywords:** adoption, affect, neuroscience, attachment, parenting, new materialism

Conventionally figured as sets of compelling abstract theories and/or complex data arising from controlled laboratory conditions, science is increasingly recruited into social and cultural theory, particularly by those interested in understanding the radical indeterminacies of non-human worlds, and decreasingly seen as something that requires distant critical interrogation. This has appeared prominently in two entwined fields over the last decade: new materialism and affect theory. Scholars such as Donna Haraway, Karen Barad, Myra Hird and other new materialists argue that scientific data and theorising – from biology, neuroscience, physics and geology for example – provide much needed stimulus for critical thinking, albeit not always in a positivist way (Barad, 2007; Haraway, 1997; Hird, 2010; Blackman and Venn, 2010: 7; Papoulias and

[Callard, 2010](#)). More specifically, in the [important strands of](#) affect theory associated with Brian Massumi, Patricia Clough, William Connolly and Nigel Thrift (Clough, 2009; Connolly, 2002; Massumi, 2002; Thrift, 2007), neuroscientific research dating back fifty years in some cases resonates, as Margaret Wetherell puts it [in her critical overview](#), 'with a new focus on materiality and relationality, part of broader emphases on the interweaving of the material, the social, the biological and the cultural, exploring processes of their co-joint figuring and articulation' (Wetherell, 2013: 350).<sup>i</sup> Simultaneously, the development of new technologies of visualisation such as MRI scanning has re-invigorated scientific claims about the neurobiological elements of human behaviour; bringing brains into fields previously understood in less biological terms- (discourses around dyslexia and ADHD provide [clear-interesting](#) examples) (Dumit, 2004; Rapp, 2011)). But how might we understand the simultaneous popularity of science in social theory and public debate? What is 'science' in these realms? And how should we orient ourselves to it?

Arguing that there is little clarity around how the social sciences might approach neuroscience, anthropologist Emily Martin suggests that 'the scholarly debates over what critical position to take in relation to neurological accounts of human social life would benefit from looking into what is at stake among non-experts struggling over how to position the brain in their lives' (Martin, 2010: 379). Attuned to Martin's suggestion and responding to existing debates [about the role on the incursion](#) of brain science ~~into~~ parenting discourses more broadly, this paper ~~addresses~~ [explores](#) the incursion of neuroscientific accounts of behaviour and feeling into a range of professional and lay practices associated with parenting adopted children in the U-K and the U-S. Ours is a messy case study about 'adopting neuroscience', a term we use in the double sense. It refers both to a taking-on of neuroscience (as something that we neither presume to own or know) and a nascent science of adoption, a set of largely clinical and experimental ~~knowledges~~ [vectors](#) intersecting with the State-regulated transfer of parenting responsibilities from [birth-biological!](#) to adoptive parents. ~~Ultimately~~ ~~We~~ we use this case study to reflect on broader issues about what 'science' can offer contemporary social scientific and humanities debates, [suggesting an analogy between parents' adoption of neuroscience in brain-based parenting and a useful way forward for academic debates on corporeal indeterminacy](#) ([Blackman and Featherstone, 2010: 25](#)). ~~on~~ ~~ontological~~ ~~indeterminacies~~.

As we will show, adopting science (in both its meanings) presents unsettled dynamics, intertwined with State and civil society actors at various scales, with histories and lives that thread together in a complicated weave, and with events and experiences whose framing seems to equally open to critique and affirmation. Materially, our analysis describes certain neuroanatomical structures (amygdala, hippocampus, pre-frontal cortex), molecules (cortisol, oxytocin) and ethologically-framed patterns of control and regulation in the form of attachment behaviours encounter or intersect with psychotherapeutically influenced accounts and practices of parenting. Here, science in the sense of a science-as-culture; or of experimental practices and knowledges on the move across domains remote from laboratories and clinics, merges and overflows (as much contemporary science ineluctably does) into markets and technologies. Brains feature as diagrammatic forms shaped by evolutionary, cognitive, affective and psychic events, but also become something in which to intervene. How and where do these brains come to matter in adoptive parenting? And what might we – anyone who find themselves torsioned between critical awareness of stakes and legacies and a slender optimism about something new – learn about contemporary social scientific and humanities engagements with science through their adoption?

### **Adopting Science; or Brain-based Parenting**

The specific example under analysis here is sometimes called 'brain-based adoptive parenting' (Hughes et al., 2012). This scene is part of a broader field of brain-based parenting that takes various forms, from parenting manuals like *The Science of Parenting* (Sunderland, 2008) and the best-selling *Why Love Matters: How Affection Shapes a Baby's Brain* (Gerhardt, 2004) to more technical reports and scientific publications on the neuroscience of attachment and brain development (Landers and Sullivan, 2012; Moutsiana et al., 2014; Perry and Sullivan, 2014; Sarro et al., 2014). The material in this paper derives from nine years' personal engagement, both as parents and science studies scholars, with brain-based parenting. As adoptive parents of children removed from their birth parents by the British state, we encountered these discourses in preparatory courses and interviews led by State-employed social workers, in post-adoption support and training provided by adoption NGOs, in adoption-specific books and leaflets, in conversations with other adopters, in encounters with clinical psychologists and psychotherapists, and in events hosted by national and regional

adoption advocacy and support organisations such as Adoption UK. Although we focus on our UK experience, many of the textual and online resources in this field are produced in the United States, and key figures, clinics and research centres are also US-based. The trans-Atlantic traffic in theories, accounts, training and people is highly significant here.

In the UK, the development of neuroscientifically-informed accounts of parenting is politically charged. A variety of contemporary government and non-government policy initiatives in relation to childcare, education, parenting, families and social welfare bear the marks of brain sciences. Such developments have been variously criticised in terms of their as neoliberal, entrepreneurial and/or simply discriminatory biases (O'Connor and Joffe, 2013; Wastell and White, 2012). On good grounds, social scientists usually regard the resort to accounts of the brain in government social care policies with suspicion. Claims about revolutionary advances in scientific understanding have too often in the past been too entangled with developments in governmentality, biopolitics or capitalist modes of production to be taken as liberatory. Analyses of media treatments of neuroscience and neuroscience in the public sphere point to similar conclusions (O'Connor and Joffe, 2013). In the context of parenting and social policy, social scientific accounts are particularly critical of the blending of neuroscience and social care policies, arguing that the turn to neurology – what Wastell and White, following Tallis (2011) dub 'neuromania;' – signals a move away from questions of economics, inequalities and discrimination:

The co-option of neuroscience has medicalised policy discourse, silencing vital moral debate and pushing practice in the direction of standardised, targeted interventions rather than simpler forms of family and community support, which can yield more sustainable results (Wastell and White, 2012, 397).

Wastell and White are also highly critical of the way in which policy makers read neuroscience. Indeed, they provide an alternative reading that concludes 'that the infant brain is not readily susceptible to permanent and irreversible damage from psychosocial deprivation. Rather, plasticity and resilience seem to be the general rule' (397). This critical focus on *irreversible* damage, in our view, sidelines the claims about serious (*albeit open to therapeutic intervention*) brain changes that are at the core of the scientific literature on neglected and abused children that we will discuss here. Their Wastell and White's paper also focuses on scientific claims about cognitive capacity and adult mental health, rather than relational difficulties in

childhood. Citing Belsky and de Haan's (2011) review of studies relating to parenting, ~~Wastell and White~~ they argue that neuroscience does not yet 'add anything practically to what could be gleaned by conventional observation and treatment' (Wastell and White, 2012: 411).

Although agreeing that policy should focus on addressing poverty and discrimination,<sup>7</sup> we want to also argue that the troubled, compromised practices taking shape at the intersection of neuroscience, social work and parenting are not reducible to neoliberal obfuscation or reductionism. Indeed, our experience of this field leads us to argue that brain-based parenting can involve significant and sometimes seriously helpful shifts in parents' and childrens' sense of agency, moving from personhood based on psychological interiority to one that attempts to figure the brain and brain chemistry and processes as agentic without either re-locating the locus of agency to the brain (as causal or determining process) or to biomedicine as the institutional-epistemic embodiment of governing expertise. As we will show, these shifts bring with them perplexing mixtures of determinism ('it's the brain doing it') and release in practice from forms of determinism ('the brain can be changed') that challenge easy rejections of this work as biologically determinist or reductive (see also Martin, 2010). In the context of this special issue, we want ~~also~~ to suggest that this experience of mixed (in)determinacy might be ~~be~~ instructive for debates around the contemporary turn to science as a resource for the social sciences and humanities. Our account of the re-purposing of neuroscientific concepts and artefacts, and the re-training and re-shaping of social work and parenting that takes place in brain-based parenting provides an analogy <sup>2</sup>for how social scientists and humanities scholars might best adopt science.

### *Indeterminate determinacy in brain-based parenting*

Coming into direct contact with brain-based understandings and techniques for the first time during post-adoption parenting workshops in 2008 was sometimes a discomfoting experience for us. In terms of social and cultural theory (in particular, post-representationalist theories of affect<sup>ii</sup>), in terms of science and technology studies (in particular, a material-semiotic view of scientific knowledge<sup>iii</sup>), and in terms of a critical stance on thinly disguised individualising understandings of subjectivity and kinship, there were many reasons to be sceptical or mistrustful of brain-based understandings of parenting, whether they were applied to children, adults, or both together. ~~One of the most difficult things for us as academics was the~~

~~eclectic approach of our~~ Our social worker teachers: ~~they~~ had received almost no formal training in brain sciences and had had to rely on their own piecemeal attendance at workshops and book and website reading to pull together a coherent enough programme for the stream of stressed adoptive parents who were their clients, some of whom had been struggling with parenting traumatised children for more than 10 years without the help of any form of 'science'.<sup>iv</sup> ~~Our teachers'~~ Their eclectic approach meant that all sorts of models, facts and factoids (anecdotally-presented and hence somewhat vaguely determined facts) were mixed together: psychodynamic and attachment approaches mingled freely with both neuroscientific and social work-based knowledge claims. Our nerdy highlighting of the problematic conceptual patchwork this produced was met with encouragement that what was being provided was 'just a toolbox' from which we, and our new friends, could take what we found useful.<sup>v</sup> Interestingly, recent critiques of affect theory's use of neuroscience have suggested that cultural and social theorists are similarly eclectic in their borrowings (Leys, 2011).

Courses like these, delivered in Local Authority community or civic centres amidst a plenitude of PowerPoint presentations, cups of tea and coffee, sandwiches, biscuits, and seats set in circles, deal with often enormously challenging parenting experiences. They directly address parents and carers whose children (those with diagnoses of autism, attention deficit hyperactivity disorder and attachment difficulties, as well as those with traumatic histories) do not seem to be anywhere near capable of doing what their parents hoped they might; they respond to crises in which well-meant care practices seem to be unable to maintain familial ties.<sup>vi</sup> In such settings, can brain science materially re-configure participants' senses of self, potentials for change and relational awareness in the face of overwhelming feelings of powerlessness, rage, frustration and unhappiness?

As in Martin's (2010: 370) study of bipolar disorder, a common utterance in brain-based parenting talk is: 'It's the brain doing it.' In the classes we attended with parents of 'challenging children', such utterances were associated with palpable parental relief and a kindling of compassion. Inexplicable, infuriating behaviour seemed to take on less intimidating and more amenable form thought through a brain model. The resulting proposition might go something like this: our child can't listen to reason when she's in the midst of a tantrum because her higher brain is 'out to lunch' and her 'reptilian' brain has taken over. For whatever reason, she is

experiencing a ~~fundamental terror~~ form of terror in which her brain produces chemicals normally associated with running from wild animals or fighting off killers. At this point she cannot engage her higher thinking brain: we will have to wait until she has calmed down before trying to sort things out. As explained below, in these encounters, particular biomolecules such as cortisol and oxytocin and particular neuro-anatomical constructs such as the amygdala and hippocampus come together with existing psycho-social framings of child-parent relations based in attachment theory. Encountering difficult behaviour and overwhelming feelings, we learn to ask: is there some visual trigger, olfactory memory or metabolic state (blood sugar, heat rate, cortisol) pointing to other more dangerous places or times – something like a body memory – at play here? Perhaps re-mapping those mundane but shocking events – he spat in my face; she deliberately smashed the bowl – through ethological or biochemical processes might bring parents to engage differently with what is happening to the child or between the child and themselves in that moment, and thereby help both the child and themselves to remain anchored in the present (which is less frightening or dangerous in objective terms).

-Brain-based parenting implies a shift in normative attributions of agency. This shift, as we have already indicated, is likely to set alarm bells ringing, at least for readers who are sensitive to the many biopolitically loaded investments in behavioural and neuroscientific understandings of behaviour, emotion, habit and memory (for instance, critics who regard brain-based parenting as an armature of neoliberal governmentality). The scene of address could be viewed as another example of the somatic citizenship or refashioning of vitality as a site of experimentation on self that Paul Rabinow and Nikolas Rose guardedly affirmed almost a decade ago (Rabinow and Rose, 2006). Learning from colleagues in science studies, we suggest that a central question for social researchers trying to make sense of these, and similar developments, is: how do these uneasy mixtures of neurochemical agency, logics of care and regimes of engagement come together in practice? The details and specificity of what moves between specific scientific fields, forms of psycho-social expert practice and the wider domains of parent-child dynamics matter when addressing this question. We also want to argue that the problem of sticking with brain-based adoptive parenting amidst all its sometimes contradictory or at least awkwardly concatenated imperatives is typical of the problem of inhabiting technoscientific regimes more generally. Rather than the love Haraway espouses for biology

(1997: 151) or Barad demonstrates for physics (2007), we feel a kind of wondering ambivalence about the neuroscience of parenting that seems worth elaborating. .

### **The neuroscience of attachment**

Neuroscience is a quite recent arrival to the literature on adoption and social work. Most of the adoptive parenting and professional social care literature of the last two decades has relied on the models of attachment developed by John Bowlby from the late 1950s—80s, in which the brain scarcely figures; the focus is instead on an account of affect as adaptation. *A Secure Base: Parent Child Attachment and Healthy Human Development* (Bowlby, 2008), for example, only uses the word 'brain' once. In both clinical and community social work academic and professional literature since the 1990s, attachment theory has become a stable frame. Given that Bowlby's attachment theory was already an attempt to update psychoanalytic theories of subjectivity via biology, in particular, drawing on the findings of behavioural ethology (Ainsworth and Bowlby, 1991; Bowlby, 1969), the recent renovation of attachment theory via neuroscience (see (Schoore and Schoore, 2008)) is a striking re-biologisation of an already psycho-biological theory. In notable parallel with social and cultural theory, the focus in much of the clinical and community social work literature of the last decade and a half has been on the regulation of affect. The coalescence of attachment theory, cognitive science and neuroscience has largely been developed in the name of ameliorating the long-term effects of early childhood trauma on affective regulation. Writing around 2000, for example, Janet Shapiro and Jeffrey Applegate suggest that 'the sequelae of affectively dysregulated caregiving experiences can be severe and long lasting' (Shapiro and Applegate, 2000: 10). The central feature in all this is a typology of attachment styles – secure, anxious-insecure, avoidant-insecure, disorganised-insecure and chaotic – that now provides a classificatory schema widely used in clinical and therapeutic practice as well as in standard social worker case-reporting about children in care and the training of adoptive parents (for a critical analysis, see Duschinsky, Greco and Solomon, 2015a and b).

The recent circulation of neurophysiology, neuroanatomy, and neuroendocrinology into attachment theory brings with it a number of different emphases and problems of assimilating heterogeneous epistemic and practical concerns. Both the popular how-to books and the professional literature for therapists, social workers and others describe the evolutionary structure of the human brain using images and figures that

combine anatomical drawings of the brain and models of cognitive processes. In some cases they offer ways of remembering and internalising knowledge of brain structure and processes using either mnemonics or gestures. In every course we went to, we were encouraged to buy, borrow and read books in this area. We have already mentioned popular books on the brain and parenting by Sunderland and Gerhardt. The more specialised literature for adoptive parents or parents of other 'challenging children' includes books by Daniel Siegel (Bryson and Siegel, 2012; Siegel, 2010a, 2010b; Siegel and Bryson, 2014), Daniel Hughes (Hughes, 2006; Hughes et al., 2012), Bryan Post (Post, 2009, 2010), Kim Golding (Golding, 2012), Deborah Gray (Gray, 2012) and Joanna North (North, 2013). The volume of this literature increases annually and, as seen in the catalogues of specialist Jessica Kingsley Publishers, for example, now include works by parents such as Sally Donovan (Donovan, 2013, 2014), Caroline Archer and Christine Gordon (Archer, 2012) and books for children (Collins-Donnelly, 2014a, 2014b), all of which encourage readers to understand and engage with adopted children (and sometimes their parents) in part at least through the prism of neuroscience. In the courses we attended, sections of these books regularly appeared on powerpoint slides or handouts, and we sometimes watched snippets of promotional or educational videos made by key authors. One trainer (a British NHS-employed clinical psychologist) - with whom one of us did a 6x half-day sessions course - delivered her 'own' accounts of neuroscience without directly referencing these kinds of books (or indeed any specific scientific papers). Indeed, it is important to note that scientific papers were never present except in the footnotes of books: as parents we have not been encouraged to read technical literature, to access PubMed or other relevant database to explore primary literatures.

An evolutionary differentiation between reptilian, mammalian and human layers of brain structure is frequently emphasised in this literature: the anatomy of the brain is understood as an ontogenetic composite. Some behavioural and emotional responses to the world and/or other people are understood in brain terms as reptilian, some as mammalian and some as more human. Reptilian reactions tend to be fast, highly reactive and indiscriminate. 'Fight or flight' reactions are 'lower' in the brain, arising from the brain stem close to the spinal cord with all its afferent and efferent connectivity to other parts of the body, and to feelings of hunger, thirst, sexual arousal or sleepiness (Siegel, 2010a: 16). Limbic system or mammalian reactions, said to be only around 200 million years old, are more complicated because they 'help create the "e-motions" that

“evoke motion” (Siegel, 2010a: 17). Limbic system brain elements such as the hippocampus and amygdala are 'crucial for how we form relationships, have a sense of 'good' and 'bad', and become emotionally attached to one another' (Siegel, 2010a: 17). Other elements of the limbic system such as the hypothalamus send and receive hormones throughout the body, regulating both sex hormones and the critical 'stress' hormone, cortisol, which is involved in elevated alertness, heightened blood pressure and in the long term, learning problems. Finally, cortical brain states are 'higher' in relation to the base of the brain, they are 'cognitive' in the sense that they 'know' things, and they are potentially constitutive of an individuated sense of self, since cortical states not only refer to the world but to the subject's feeling about the world. The cortex is described as a largely primate part of the brain; the prefrontal cortex in particular is important because it folds over all three major regions of the brain, connecting cortex, limbic and brainstem areas. As Daniel Siegel, a therapist and neuroscientist frequently cited in adoptive parenting books, writes: 'as the prefrontal cortex helps coordinate and balance the firing patterns from these many regions, it is profoundly integrative' (Siegel, 2010, 22). This 'integrative' function of the pre-frontal cortex is normative and experientially-derived: it does not 'come naturally' so to speak.

This rough and ready summary of the neuroscientific accounts of the brain we have been taught does not do justice to the gamut of more or less well-informed brain-based accounts of selfhood, child development and parenting found in the literature to which we are referring. It is meant to sketch some of the broad transformations occurring in a brain-based approach to parenting. Importantly for our argument here, the kernel of interest in the brain or neural structures is that 'findings from science now confirm the notion that the mind can activate the brain's circuitry in ways that change the brain's structural connections' (Siegel, 2010b: 7). It is this activation of brain by 'mind' – a term that Siegel insists on in promoting an awareness he calls 'mindfulness' – that bridges between neuroscience and an altered understanding of what it means to be a child or to parent a child. Worked through by experienced psychotherapists such as Siegel, Hughes and others, the notion that purposeful (mental and physical) interventions can change neurological flows is now core in brain-based adoptive parenting. Here neurochemistry - as a relatively alterable set of flows when compared to brain structures - enters the frame and processes like the circulation of a complex biomolecular form such as cortisol becomes germane to thinking about 'challenging' or atypical behaviours. Importantly,

in this literature, the epistemological problem of correlation between concentrations of molecule or patterns of neuronal activation and states of awareness, a problem that has long exercised philosophers of mind, does not loom large. The concern is more practical: by what means (usually apart from drugs) can flows of movements and affects be re-shaped or re-directed so that they connect more to the present situation, and less to patterns of response developed under different circumstances (family histories, institutional norms, received values)?

**Experimenting with acting and indeterminacy Practising indeterminacy in caring for children**

*As we have hinted already, in its positioning between determinism and flexibility and its interest in the materiality of bodily encounters and their social life, brain-based parenting has ~~some~~ conceptual and historical overlaps with a key strand of the the 'affective turn' in social and cultural theory. The Eaffect turn, emblematised here by the work of Brian Massumi (Massumi, 2002) and widely discussed in feminist and post-humanist research publications (Clough, 2009; Hemmings, 2005; Sedgwick and Frank, 2003), these theories draws on neuroscience to present affect as a process that activates but does not act in bodies, that precedes and exceeds conscious perceptions and intentions or cognitive states of awareness, and that does not presume any given identity or boundedness of individual or body. As Constantina Papoulias and Felicity Callard write:*

This new materiality is presented as disturbing familiar hierarchies (most obviously that in which the 'mind' is positioned as the executive director of the body), depending instead on a novel micro-geography of synaptic connections, cellular interactions and electrochemical flows that operate in a dispersed fashion and below the level of consciousness. (Papoulias and Callard, 2010: 35–36)

~~Here, a~~Affect entails sometimes very convoluted transformations between sensation and movement. As a 'pure capacity' (Massumi, 2002, 16), ~~it~~ affect is not a ~~particularly specifically~~ human attribute or property, although certain normative notions of the human inevitably code patterns of affect as emotions. Human or inhuman, affect is relational. As a capacity for activation, it is essentially a form of autonomous openness or indeterminacy (Massumi, 1995). Affectivity, however, is not essentially subjective. ~~Affects is in things;~~ at least to the extent that things and matter more generally possess a quasi-neural capacity to be activated.

In contrast, while the brain-based parenting literature also starts from a view of the brain as an open system whose organisation precedes and subtends stable patterns of cognition, intention or language/discourse, it does not affirm the autonomy of this receptive capacity. In this field, ~~not only are~~ neural patterns of activation ~~themselves are not only~~ triggered by events, but ~~they~~ have developmental trajectories and histories. In this approach, relations within the brain – for instance, between the neocortex and the mid-brain hippocampus or brainstem – can only be reshaped through relational practices, not autonomously. Indeed, in brain-based adoptive parenting literatures, the autonomy of affect, its tendency to contagiously trigger rapidly cascading movements, figures as an artefact of the ruptures and developmental blockages of missed and/or neglectful or abusive care; that is, as a problem to be addressed. For adoptees, the process of learning to not instantly panic at some sound or smell associated with an unconsciously or pre-verbally remembered event, for instance, establishes new patterns or topologies that reconfigure existing sensitivities. This slowing down ~~entails forges~~ new paths and neurochemical signal propagation patterns between neocortical, mid and lower brain. But this intra-brain relationality vitally depends on wider circuits of movement running between ~~children~~ and others, such as carers. Affect flows, not because it is transmitted, but because others also have the capacity be activated ~~in a variety of ways, some of which may have transformative potential, and yet transform that activation differently.~~ As Teresa Brennan describes it in her work on energy:

The attention or attentive energy received from another means that the subject-to-be is able to deal with a problem that would be difficult for it to resolve if it existed in a self-contained energetic system (Brennan, 2000: 65).

~~In terms of affective organisation,~~ Caring ~~then~~ becomes a process of feeding back the same affect differently in order to ~~slow down-~~ reorganise the ~~affective~~ excitations of sensation and movement. Care

entails much repetition and reiteration ('attentive energy' in Brennan's terms) that deflects existing trajectories of activation, usually by slowing them down through forms of other-regarding self-regulation.

We might understand this process as also affective in the sense that it seeks to ~~substitute less autonomous transitions for re-route~~ locked-on habits or movements like flight (literally panicked running away) or dissociation ~~towards less autonomous transitions~~. ~~Practically, T~~these techniques echo ~~various critiques of affect theory~~ that take issue with the autonomy attributed to affect in much affect theory; and in particular, its independence from signification and meaning (see (Leys, 2011: 443)).

How might this work in brain-based parenting? For instance, a child starts to kick the table legs, move their plate around or look rapidly in many directions around the room during a meal (triggers could include the sound of a car in the street, the colour of a particular food, a topic of conversation that provokes shame). In this situation, a parent might, to put it rather starkly, discipline or, on the other hand, in-determine (this is not a verb, but given the existence of 'indeterminacy,' 'indeterminate,' 'indeterminable,' 'indetermination' and 'determine' should be) the child. A more traditional model of discipline would demand the child stop their behaviour, perhaps offering rewards or incentives to do so (gold stars, dessert). A brain-focussed parent might instead offer the child an opportunity to sit on his lap or to be spoon-fed. Here the adult uses his own body to regulate the child's flight or fight patterns. Positive physical touch is said to raise levels of oxytocin, which counteract the increases in cortisol associated with agitation. (This is, of course, an age-old trick widely practised by parents outside of a hormonal/neurotransmitter discourse.) In starting to spoon feed the child, the parent provides a strong form of caring attention usually reserved for a much younger child, soothing the child's rising fear (of abandonment, violence, shame) and agitation, which ultimately seeks the life-saving affirmation of carer presence whilst sometimes also pushing it aggressively away.

This model of brain-based parenting responds to the underlying receptivity of affect rather than treating it as something to be extinguished (the 'naughty step' or 'gold star' approaches). Thought through brain-based parenting, both the child's brain/body and the parent's brain/body are engaged in wider circuits of affective exchange. Parents must notice and regulate their 'own' reactions – of irritation, tiredness, anxiety – whilst recognising and helping the child to manage hers. This is a deeply material-semiotic process that directly couples fluxes of signs (gestures and words) with micro-perceptual fringes of awareness of pulse, breathing,

cortisol levels, or rapidly coruscating whole-body patterns of energisation. In this somewhat cybernetic scene, feedback loops map possible movements. Attachment theory and much contemporary neuroscience are thoroughly bound up with the cybernetic image of thought (Bowker, 1993), but these loops, we want to suggest, go beyond the child-parent dyad. They diagram a range of domestic, educational and public scenes differently: the family dinner table, the classroom, or the local authority social work training room.

### *Mobilising scientific affects*

Both contemporary social and cultural theory and brain-based parenting discourses stage encounters with neuroscience. Affect theory's borrowing from neuroscience differs from that of brain-based adoptive parenting. Although similarly eclectic, it borrows concepts as if they are, like affect itself, autonomous and free-floating associative potentials.—Massumi suggests, therefore, that in such encounters, the affects of science always move alongside concepts:-

‘When you poach a scientific concept,’ ~~he argues,~~ ‘it carries with it scientific affects. Thus the transmission is two-way. The activity of the example is transmitted to the scientific concept, and the affects of science are transmitted to the example’<sup>2</sup> (Massumi, 2002, 20).

Science studies scholars have shown that scientific concepts have a web of contextual connections to institutions, laboratories, devices, economies, ethics and lives (Hackett ~~and Society for Social Studies of Science~~, 2008). These connections can be determined to the extent that they are subject to a power-laden context that anchors and directs movements. But concepts are also processual entities that bear within themselves fringes of newness or potentiality that are not fully riveted onto the contexts they inhabit.

Through this capacity to connect, scientific concepts always have an affective modality. Hence, ‘scientific affects’ ~~uncontrollably~~ flicker uncontrollably across connections left dangling as concepts cross contexts. Indeed ~~from~~ both science studies’ accounts of knowledge and philosophical accounts of affect imply that, these dangling connections are inevitable since concepts grow as a kind of connective tissue or event (Stengers, 2000: 67) in an assemblage of apparatuses, devices, institutions, disciplines, laboratories, clinics (Stengers, 2000: 67). Massumi suggests that concepts are always cognitive *and* affective; forms of thinking and feeling. ~~That is, e~~Every scientific concept, then, by virtue of its relational mode of existence, ~~bears within itself fringes of indeterminate potential,~~ ‘a connecting thread of affect meandering impersonally

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~~throughout the world' (Massumi, 2002: 227) or something that exceeds the determinate context in which it emerged, as a way of tethering vagueness, commonsense or anecdote to experimental devices and practices.~~

We similarly want to suggest that the concepts that brain-based parenting adopts (a term we prefer to 'poaching' to describe what goes on here) from recent neuroscience affectively shape people's sense of what they might do in both obvious and subtle ways and that this could be considered a form of in/determination rather than determination. But, as critics of affect theory's engagement of neuroscience have suggested (Blackman and Venn, 2010), their adoption of neuroscientific concepts and affects in brain-based parenting is neither ~~not~~ free-floating nor meandering, in the way that theories of affect as self-creative, irruptive global openness to change propose. Indeed, we think ~~Indeed, such it important to stress that the~~ adoption of neuroscientific concepts and their affects necessarily encounters obstacles, regulatory failures and developmental blockages. What might this mix of two-way affective transmission and specific regulatory organisation look like in our case study?

The brain-based parenting literature makes a plethora of connections to the concept of the 'stress hormone', tracking along the many behavioural, psychological, psychiatric, pediatric and zoological research findings that concern cortisol. The role of the limbic system in regulating cortisol and how cortisol plays out in range of 'stress' effects provides a good example of these difficulties. Research on cortisol has burgeoned in the last three decades. (The biomedical literature database PubMed shows a steeply rising rate of annual publications with cortisol in the title or abstract, with around 1500 publications appearing annually in 2012.)<sup>vii</sup> ~~The brain-based parenting literature makes a plethora of connections to the concept of the 'stress hormone', tracking along the many behavioural, psychological, psychiatric, pediatric and zoological research findings that concern cortisol. While cortisol might be a somewhat exemplary example, it is certainly not isolated.~~

The 'love hormone' oxytocin, 'mirror neurones', or the hair-trigger 'good-bad' threat classification system, the amygdala; (all milestone focal points in the last few decades of neuroscientific research); also show comparable levels of connectivity and affiliate widely in various movements across fields, human, non-human.

In the neuroscientific literature, cortisol plays an important connective, even integrative, role in childrens' development. Cortisol is a hormone that 'messages bodies' (Roberts, 2007), connecting growth, immune

response, basic bodily metabolism and memory formation.- Cortisol levels (and indeed the cortisol levels of a pregnant woman and of the sperm-providing father (Rodgers et al., 2013)) are said to affect how a child grows bone, muscle and fat, how they pay attention, how they remember, how they fall ill, how they eat, how often they urinate, or how they react to a face (“the mother's disapproving face can trigger off stress hormones like cortisol which stops the endorphins and dopamine neurons in their tracks – and also stops the pleasurable feelings they generate’ (Gerhardt, 2004: 47)). This connective role is picked up and elaborated in the more therapeutic and practical brain-based parenting discourses.

Let us use the work of our favourite popular figure in the brain-based parenting field to explore how this is done. Along with Siegel and Sunderland, American clinical psychologist Daniel Hughes has been keynote speaker to Adoption UK’s annual conference for parents, which we attended in 2013. (Adoption UK is one of the leading adoption support charities and plays a key role in promoting the use of brain-based and therapeutic parenting in the UK). We were also introduced to his work in our initial training sessions with social workers and have used his books to lobby our children’s school teachers to change their practices in the classroom and playground (albeit with limited success). Importantly for this paper, Hughes’ books for parents - *Building the Bonds of Attachment* (2006), *Attachment-focused Parenting* (2009) and *Brain-based Parenting: The neuroscience of caregiving for healthy attachment* (Hughes and Baylin, 2012, with foreword by Daniel Siegel) - document an increasing focus on the neurological alongside an interpersonal psychological/ attachment approach.

Although in each book, Hughes models and advocates forms of parental practice (child-oriented behaviour, and talk, and self-care) that build secure attachments, in the most recent book he combines this with detailed explanations (written by Baylin, another psychologist) of brain chemistry: Chapter One is entitled ‘Parenting is a Brain Thing’. What is most fascinating here is the unusual focus on the parent’s brain rather than only the child’s brain. Readers are encouraged to ‘build... a healthy parenting brain: bottom up and top down’ (p. 24) and to learn and understand the functions of each section of the ‘caregiving brain’ (Hughes and Baylin, 2012: 24). The chapter includes a section on ‘Priming the parenting brain: hormonal prepping of the caregiving process’ (p. 30). In a world in which many children and parents use medications to manage anxiety and stress (see Dumit, 2012), hormones are here described as acting ‘like’ drugs: parents are

encouraged to use self-care practices that will decrease levels of cortisol and increase the levels of good hormones and neuropeptides (oxytocin and dopamine) so they can better respond to and help their children:

Oxytocin acts much like an anti-anxiety medicine in your brain, helping to keep your amygdala-driven alarm system calm while activating your brain's approach system, the smart vagal system that

Porges describes as the neural basis for loving relationships (Hughes and Baylin, 2012: p. 31).

Parents' own childhood experiences shape their adult capacities to parent: 'In parenting terms, early brain development lays the groundwork for self-regulation and personal security, helping to build a healthy parenting brain' (Hughes and Baylin, 2012: 30). In this way, all the talk about attachment and babies' brains that underpins other parenting education ('you need to understand your child's brain so you can make sense of their behaviour') comes home to roost ('your capacity to respond to your child in a helpful depends on your early experiences of care when you learnt – or failed to learn – how to self-regulate and make connections with others'). So, 'parenting is a brain thing' because it is about the meeting of at least two brains: 'when the parent's brain meets the child's brain' (p. 49).

In our dinner table scenario above, where cortisol levels can become high all round, Hughes and Baylin would argue that 'the challenge for your parenting brain is to stay in safe mode even when your child is not in his or her safe mode' (p. Hughes and Baylin, 2012: 59). This involves what they, following neuroscientist Stephen Porges ((Porges, 2011)REF(Citation)), call 'neuroception'; an automatic, 'bottom-up' movement, a confluence of cortisol, oxytocin and adrenalin, in which the limbic brain system makes a rapid assessment about danger and 'orchestrates our emotional and behavioural state accordingly' (Hughes and Baylin, 2010: p. 58-9). Being with a child who is not in their safe mode is disturbing: parents need to use their 'minds' (in Siegel's terms) or cortical processes to notice and steer their limbic response, which might be to respond punitively in a fearful attempt to extinguish the child's behaviour.

Importantly, Hughes and Baylin argue that this capacity to understand and decelerate highly affective movements provides essential learning for the child in the scene: remaining calm means that the child's fear will not escalate; indeed they will experience a de-escalation of neuroceptive response that is positive and can be repeated. This is describe as a positive cycle of care: 'Your ability to keep your lid on and stay "parental" helps your child build those brain "muscles" he or she will need to do the same with those

wonderful grandchildren you will have someday. This is why the health of your brain is so vital to creating a really positive, growthful cycle of good care in your family' ([Hughes and Baylin, 2010:p-59](#)). Using the term 'blocked care', Hughes and Baylin also argue that these relational, historical flows similarly explain the cross-generational recurrence of neglect and abuse in highly stressed families. Here too, brain explanations are used to explain difficulties but also the possibility of change:

Since blocked care involves the suppression of caring feelings, not permanent impairment of the potential or caring about a child, we see blocked care as a treatable condition. To us, this is the value of understanding the parental brain and how stress can suppress the caregiving process, making it seem to parents, and even to therapists, that the parents are simply uncaring and unempathic, when, in reality, their caring potential might very well be "awakened" or restored with sensitive, brain-based intervention' (~~[Hughes et al., 2012: \(p. 101\)](#)~~).

Hughes' approach to brain-based parenting depends on skilled parental insight and consequent self-care and self-regulation as well as the psychological and material support of other adults. He suggests that parents approach their children with playfulness, acceptance, curiosity and empathy (PACE), and emphasises the interpersonal, interactive nature of child-parent relations. Neuroscience here underpins a previously elaborated model based on attachment theory and interpersonal psychological models of subjectivity. Hughes does not advocate a drugs-based approach to decreasing cortisol and increasing oxytocin, but rather encourages practices of speech, touch and physical care oriented towards changing hormonal and neural circuits.<sup>viii</sup> In this approach we encounter a model of relational, embodied subjectivity in which feelings and actions are always both neuro-chemical or 'brain-based' and social at the same time. We learn from Hughes that our relations to our children are always both about us and not about us: we adopt their feelings and in two-way circuits open up flows of our own feeling back to them. Indeed, our own experience of living with traumatised children is that change is both possible and seemingly impossible; early childhood suffering is 'hard-wired' and changeable.

### **Conclusion: Analogies of affect**

We have been trying to articulate some of the potentials and frictions associated with neuroscientific ~~concepts and affects ees~~ as ~~theyit~~ moves into the dense weave of relations around children, parenting, social

work and psychotherapy. Unlike fundamental physics, genomics, or the experimental neurosciences whose epistemic kudos can be seen in their energetic popularisation, brain-based parenting is not a culturally valorised epistemic site. Just the opposite: it is subject to constant appropriation, simplification, repackaging, commercialisation and governmentalisation. Its mundane messiness, evident contamination, exposure to appropriation and commercial and governmental pressures means that it suffers from many problems. Nevertheless it flourishes and has become something that matters (to) many adoptive parents and that sometimes helps us to get on better with our children. We have tried to explore here what we might make of it as academics interested in science, bodies and the potential for in-determining ourselves along those lines.

We have tried to do two things here in approaching this question: (1) to show how in brain-based parenting, the brain becomes a locus of action and at the same time, gives rise to new ways of thinking about the limits on our capacity to think, talk, feel, respond or act, and suggest interestingly deep material forms of intersubjectivity and relationality; (2) to discuss how the connectivity of scientific concepts, their capacity to slide into different relations, can be understood affectively, but without ignoring the many developmental and regulatory obstacles that beset affect. Whether in the form of the stress hormone cortisol, the amygdala, the hippocampus or in the accounts of mindfulness (Siegel) or neuroception (Hughes & Baylin), the neuroscientific concepts in play in the brain-based parenting literature are not purely cognitive abstractions ~~contents~~. Affectively, as capacities to activate bodies, as capacities to activate bodies, they do not exist as pure abstractions but rather material that they call for relational engagement in order to develop. ~~Affects move from (neuro)science to examples along with concepts, but activate the 'examples' differently.~~

What are the implications of our case study for ways of thinking about the wider engagements of the humanities and social sciences with science and what this can offer for developing new ontologies? The affective tone of recent work on new materialisms ~~is~~ frequently optimistic, excited and largely affirmative in relation to what it gets from sciences such as microbiology, genomics, neurology, physiology, geology and ecology. Much of this work distances itself from a more critical approach to science, arguing that criticisms of scientific concepts and data often miss the possible challenges that these can provide for social theory (see, for example, (Barad, 2007; Grosz, 2005; Wilson, 2004)). ~~Although such attitudes have little traction in the brain-based parenting field,~~ In contrast, existing social science and humanities work on the merging of

neurology into parenting discourses, as we noted at the beginning, ~~does~~ remains firmly within a critical tradition. As adoptive parents, ~~in contrast to both these attitudes~~, we find ourselves in a rather more ambivalent, yet hopeful ~~situation~~ frame of mind: looking for how we can, via brain-based parenting, adopt neuroscience in ways that ameliorate seemingly entrenched difficulties of bodies and actions in relation.

We want to suggest, ~~in concluding, then, that there is~~ an analogy between brain-based parenting and humanities or social science scholars engaging with science more broadly. Ultimately, ~~experimental-taking the risk of messy, indeterminate~~ engagement with contemporary science (~~in its marginal and compromised, as well as more validated, forms~~) —~~getting our hands, brains and hearts dirty so to speak~~—might be more helpful than either distrustful, knowing rejection or enthusiastic embrace. Noticing and minding both the affective transmissions that come with the adoption of scientific concepts and our own affective transmissions towards our objects of study would be ~~a~~ key elements of any such encounter.

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<sup>i</sup> Other strands of affect theory do not draw on neuroscience: see, for example, papers in special issues of *Body & Society* (Blackman and Venn, 2010) and *Feminist Theory* (Pedwell and Whitehead, 2012) and Blackman (2012).

<sup>ii</sup> This term refers to theories of the subject that posit affects as operating independently of representation and see representations in language and image as consequences of codifications of affective processes.

<sup>iii</sup> This term, borrowed from Haraway (1997), articulates the impossibility of disentangling the material and discursive elements of scientific practices.

<sup>iv</sup> The local Social Services department with whom we had adopted paid for our attendance at this course as part of an outsourced post adoption support service. Other parents were paying for themselves. Our teachers were employees of a not-for-profit organisation involved in UK adoption.

<sup>v</sup> Tracey Jensen (2010: 176) points out that this 'polyvocality' is typical of contemporary parenting advice, whether provided online, on television or face-to-face. Kylie Valentine (2010) similarly highlights the confusing plethora of interventions offered to parents of children diagnosed with autism spectrum disorder and the unrealistic expectation that parents will act like rational decision-makers in an open market when deciding what to do to help their child and family.

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vi ▲ A recent study shows that around 9% of UK adoptions are disrupted (the child or young person returns to the care system), and that adopting parents experience enormous amounts of stress and difficulty keeping adoptive families together (Selwyn et al, 2014).

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vii ▲ The search: [http://www.ncbi.nlm.nih.gov/pubmed?term=cortisol\[Title%2FAbstract\]](http://www.ncbi.nlm.nih.gov/pubmed?term=cortisol[Title%2FAbstract])

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viii ▲ This is in powerful contrast to other writers and public figures in the adoption field, most notably Bryan Post, who strongly advocates the use of oxytocin as medication to address behavioural problems (Post, 2010). Hughes' and others' focus on physical and verbal interventions also distinguishes this field from others studied by social scientists, such as mood disorders and attention deficit hyperactivity disorder, in which 'brain-centred interventions' usually means psychotropic medications (Martin, 2010: 379).

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