# Reflecting on resilience and the developing brain

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# Living in the era of the “social brain”

- Once upon time we used to talk about “the social” as all those forces that shape the psychological life of the person
- Now everything that is considered social must pass through the *brain*
- Parenting, experience, identity, stress, abuse, lifestyle all pass through the brain
- So what can the brain sciences tell us about love and care in the care system?

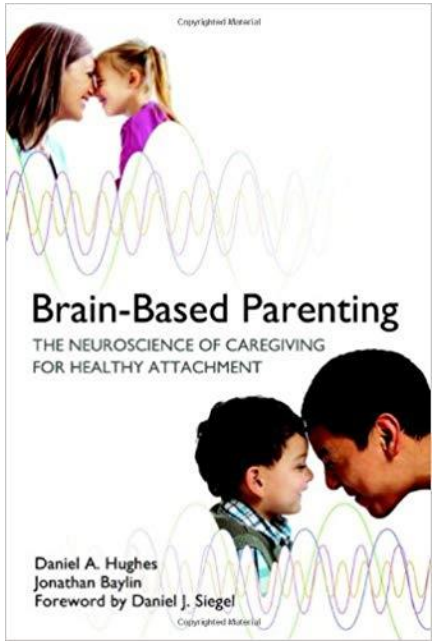
# Science versus scientism

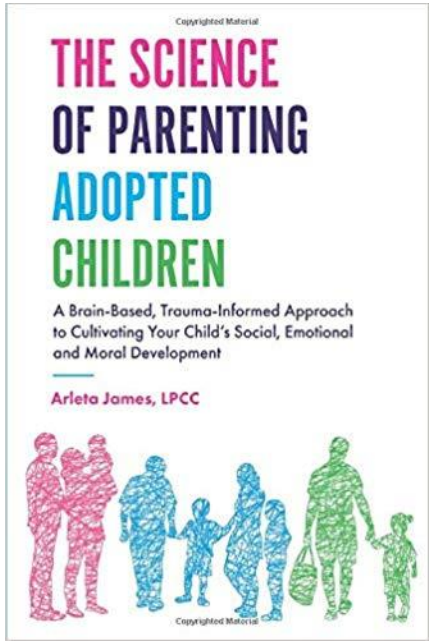
- Social policy often makes certain assumptions about “being human”
- In recent years, the brain sciences have been recruited to conjure a view of development based on infant determinism and biological fatalism*
- My belief is that understanding brain development should help us celebrate **love and care** in the care system

# Developmental neuroscience

# In the age of neuroscience, development is now inscribed in the brain

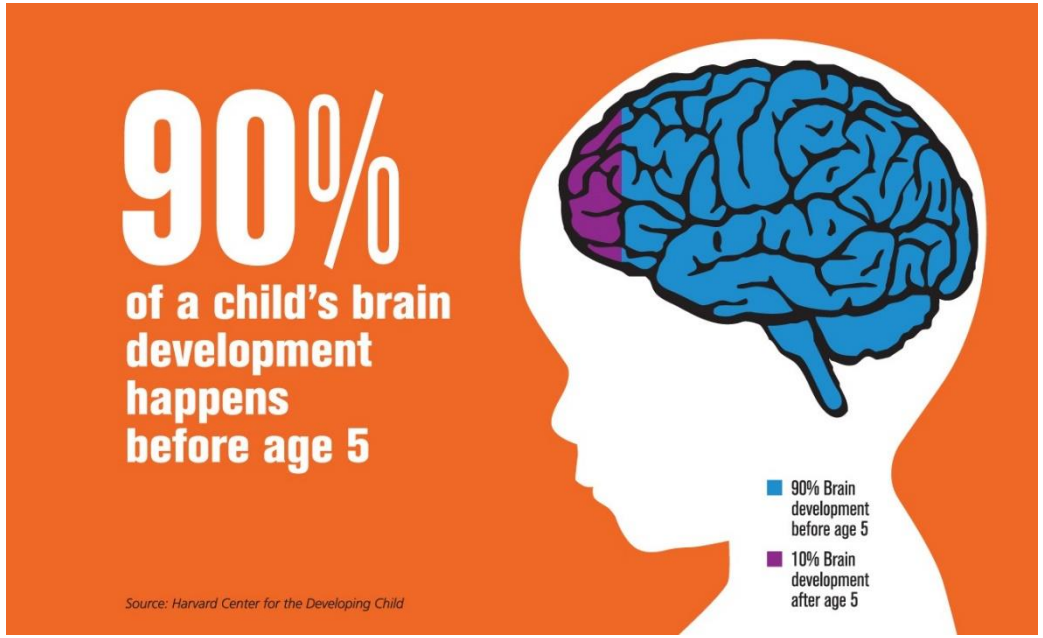
- Healthy and secure attachment is directly linked to the development of efficient right brain regulatory functions responsible for emotional development and adaptive infant mental health (Schore 2001)
- Brain architecture is now recruited as a compelling argument for intensive early intervention strategies designed to break the cycle of antisocial and violent conduct



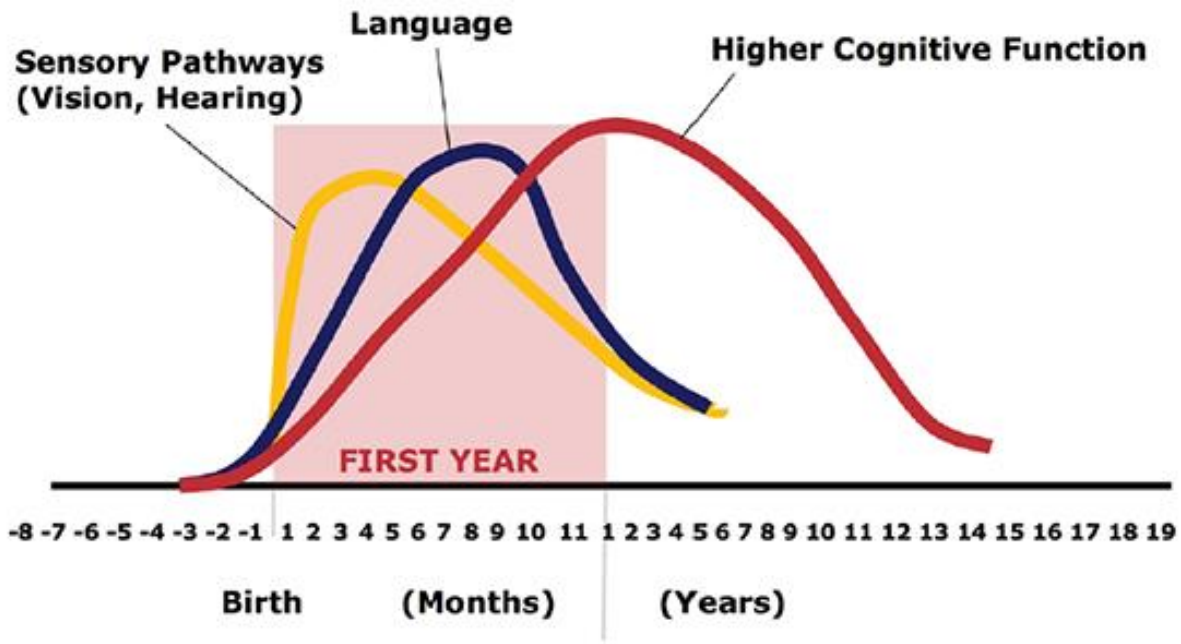



# The developing brain

- From birth to teenage years, there is a fourfold increase in the volume of the human brain
- During this period, there is marked improvements in motor, cognitive and perceptual abilities
- This sequence of development is much slower than other primates



# Neuroscience seems to reinforce the doctrine of ‘sensitive’ or ‘critical’ periods in early brain development



# The “early years” dogma

- The first three years of life are foundational, i.e. early brain experiences ‘determine’ brain architecture
- Early experiences can have a dramatic effect on the synaptic volume and organization of the brain*
- More stimulating environments increase brain volume and improve synaptic organization, esp. frontal cortex
- Failure to attain social and cognitive skills within this window of sensitivity can lead to limited cognitive and emotional development in later life

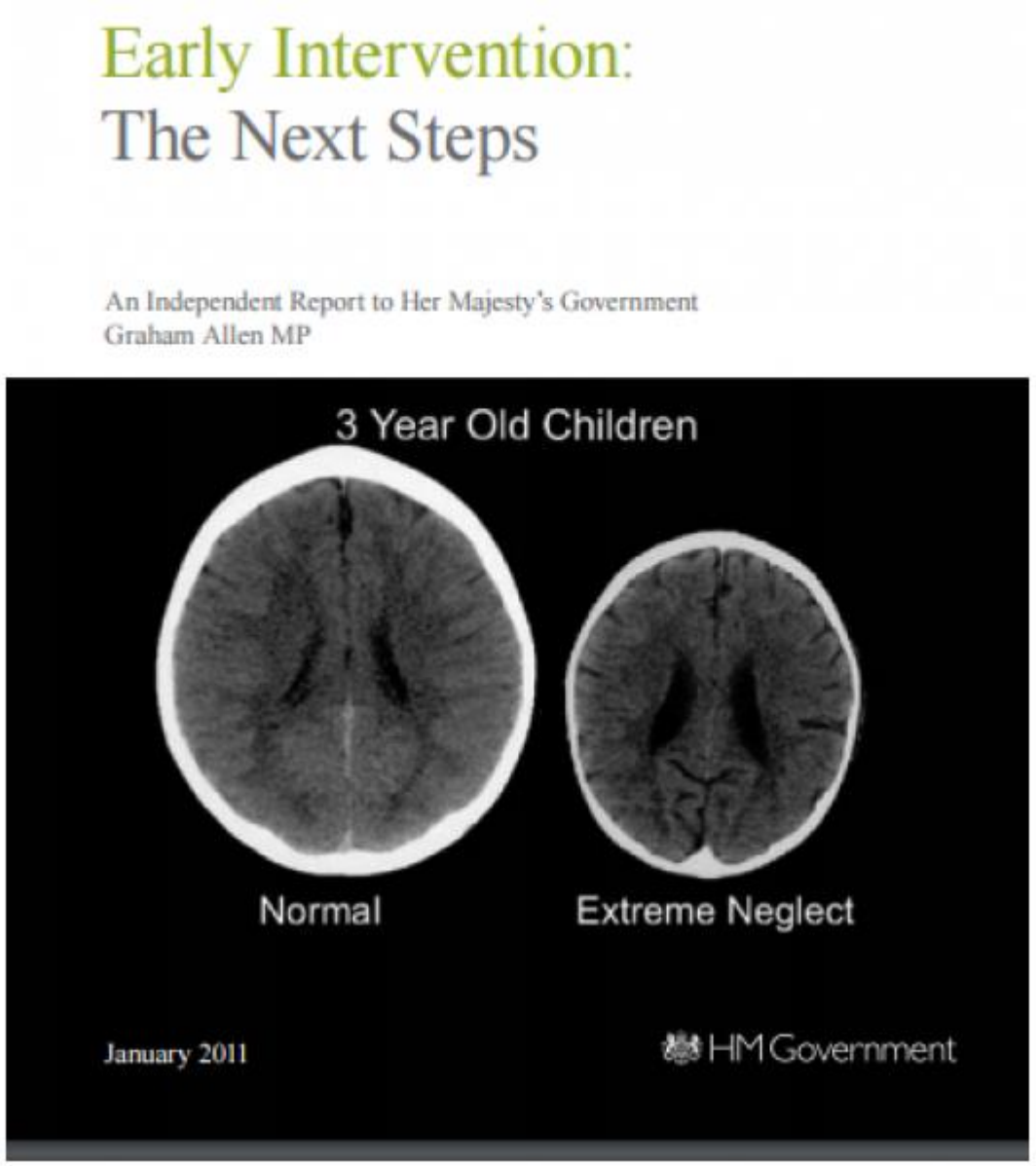
# Neuroscience and early intervention policies

- Neuroscience and brain imaging studies are often used to reinforce early intervention strategies
- Many policy documents invoke the urgency of ‘critical periods’ in brain development suggesting that biological processes are susceptible to permanent and irreversible damage from psychosocial deprivation
- Parenting is seen as both cause and solution to the child’s brain development (O’Connor and Joffe’s 2013)

# The ‘Allen Report’

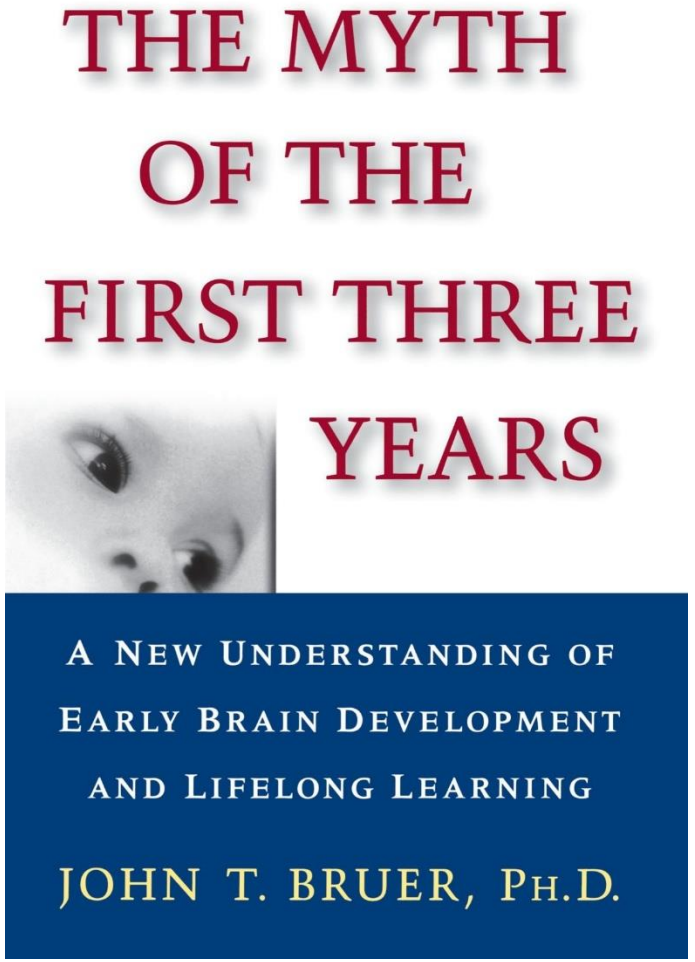
“A key finding is that babies are born with 25 per cent of their brains developed, and there is then a rapid period of development so that by the age of 3 their brains are 80 per cent developed.

In that period, neglect, the wrong type of parenting and other adverse experiences can have a profound effect on how children are emotionally ‘wired’. This will deeply influence their future responses and their ability to empathise with other people”. (Allen, 2011a: xiii)



# The myth of the “First three years”

- Bruer (1999) argues that synaptogenesis occurs well beyond the sensitive period
- Furthermore, the idea that early childhood stimulation plays a fundamental role in developmental synaptogenesis is not warranted
- Developmental synaptogenesis appears to be under mostly **genetic**, not environmental control

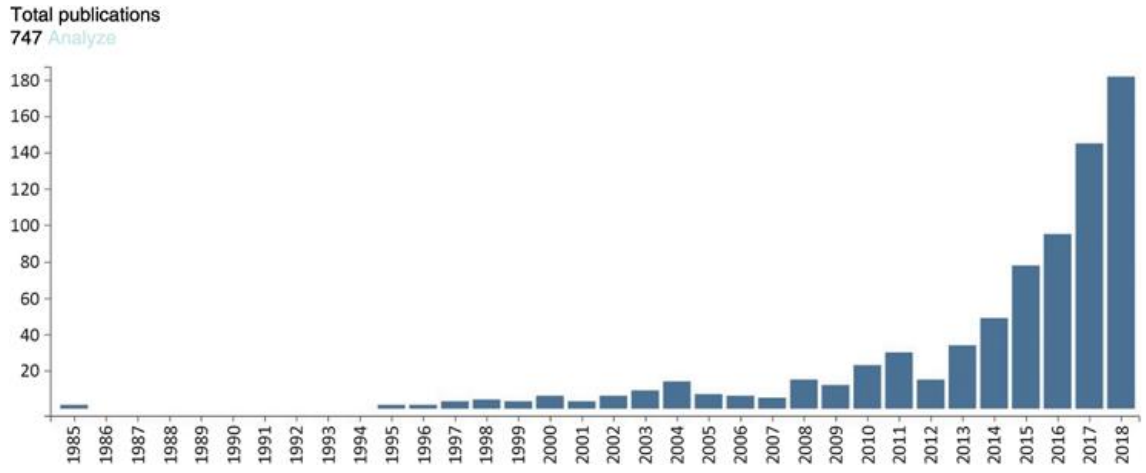


# “Misleading scientific evangelism”

- In the popular literature, the critical period is likened to “a window of opportunity that slams shut.”
- But neuroscience also shows that brain development is highly plastic and adaptable
- Michael Rutter (2002: 13) describes the claim that “early experiences determine brain development” as “misleading and fallacious … the assumption that later experiences necessarily have only minor effects is clearly wrong”

# Adverse Childhood Experiences

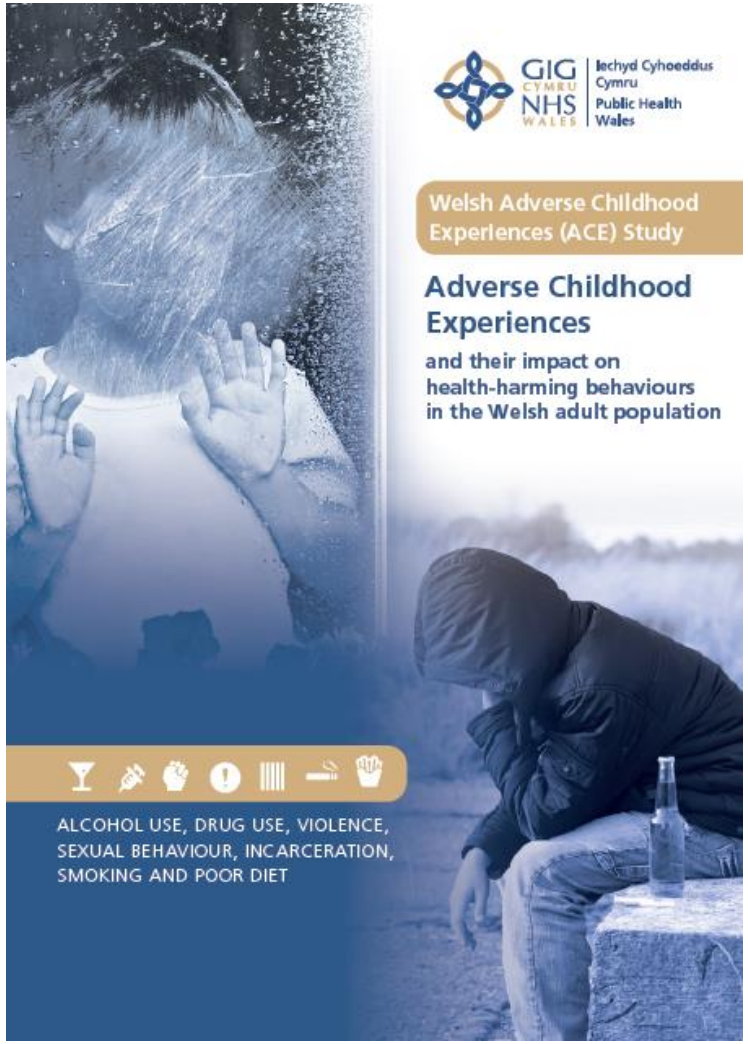
- Another example of early years determinism is found among studies claiming links between "adverse childhood experiences and long-term negative outcomes" (Felitti *et al*. 1998)
- Literature on ACEs is burgeoning with publications increasing significantly since 2016




Kelly-Irving and Delpierre (2019)

# Adverse Childhood Experiences

- Policies promoting ACE “awareness” have been vigorously campaigned in England, Scotland and Wales
- However, the scientific basis for early intervention programmes is open to question
- There is growing dissent among academics about the possible dangers of misidentifying individuals as being at-risk

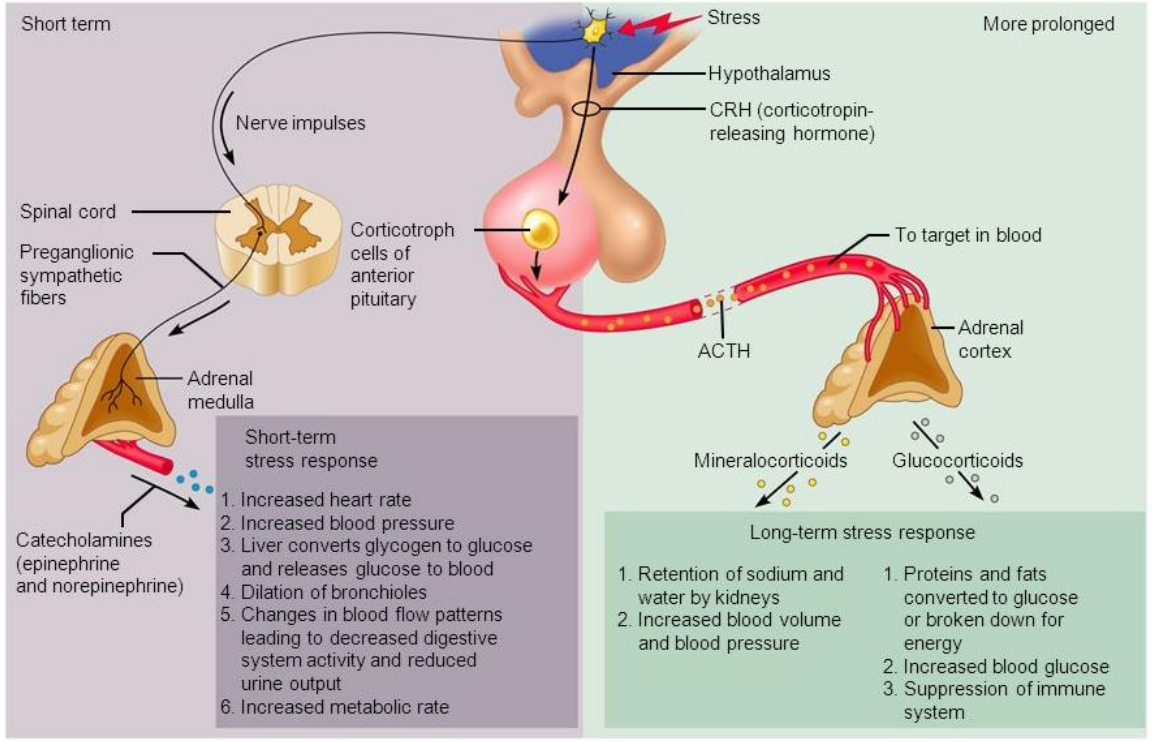


# Adverse experiences and biochemical agents

- ACEs are described as having a **dose-response** relationship with many health problems
- A person's cumulative ACEs score is **statistically associated** with risk behaviours that lead to comorbidities
- Researchers have turned to neuroscience to examine possible explanatory mechanisms

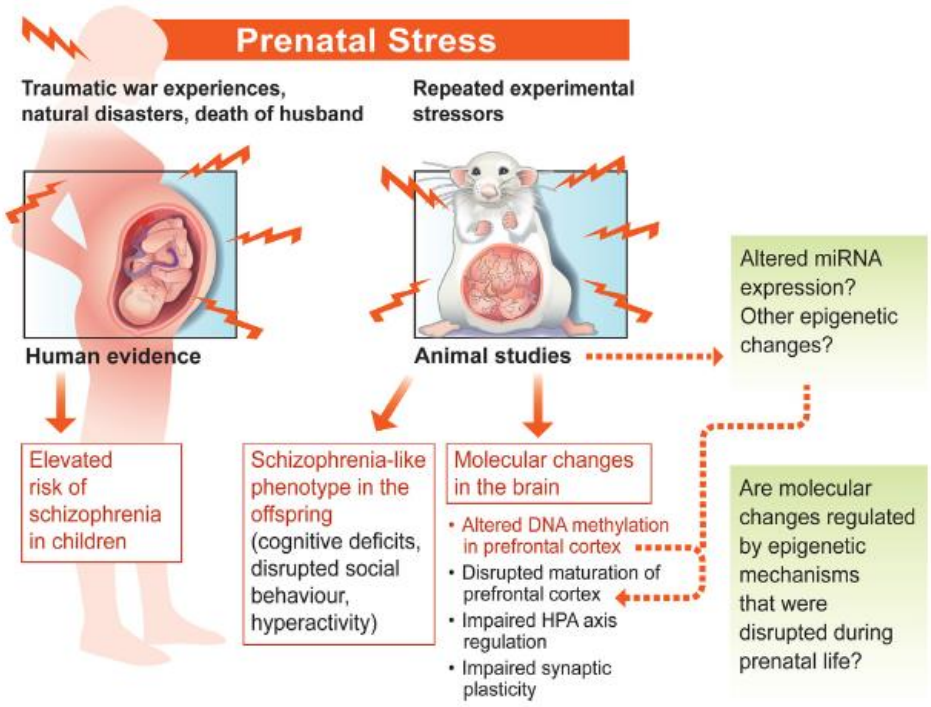
# ACEs and the neurobiology of stress

- Prolonged exposure to stressful experiences can result in elevation of **cortisol** levels
- Over the long-term, cortisol can alter the function of neural systems, suppress the immune response, and change brain architecture (McEwen *et al*. 2001, Qiu *et al*. 2013).



# ACEs and epigenetics

- Cortisol can also influence **epigenetic** processes, in which specific genes are turned ‘on’ and ‘off’ at particular times and locations in the brain
- There is also increasing evidence that maternal stress can have epigenetic effects on infants (Davis *et al*. 2011)
- Stress during pregnancy programmes brain development and lifetime mental health (Babenko *et al*. 2015)*

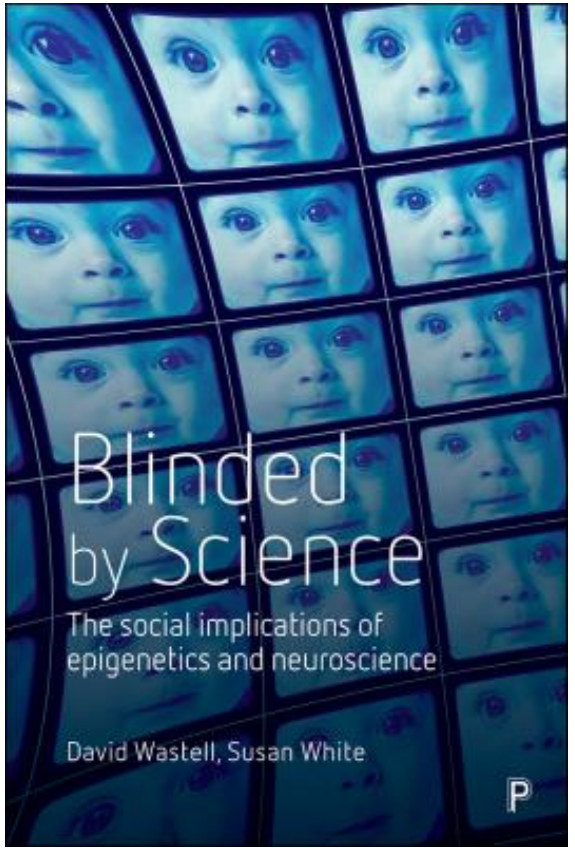


# Criticisms of ACEs policy and research

- ACE research is an epidemiological approach of correlating **recall data** from questionnaires with health outcomes
  - Recalling childhood experiences is notoriously unreliable
  - ACE variables do not indicate the severity, timing or duration of adverse experiences
  - Fails to account for how adverse experiences are interpreted by individuals
  - ACE variables do not adequately account for individual differences such as **resilience**
  - ACEs-informed policy risks stigmatising a biological underclass of dysfunctional individuals

# Misuse of neuroscience

- Wastell and White (2017) argue that neuroscience and epigenetics are being misused to justify older arguments about the role of the state in family life
- Policy interpretations of brain science adopt a ‘soft’ biological determinism which pushes practice in the direction of standardised, targeted interventions rather than family and community support
- Rather than stressing irreversible damage, the new biology can equally stress **plasticity** and **resilience**



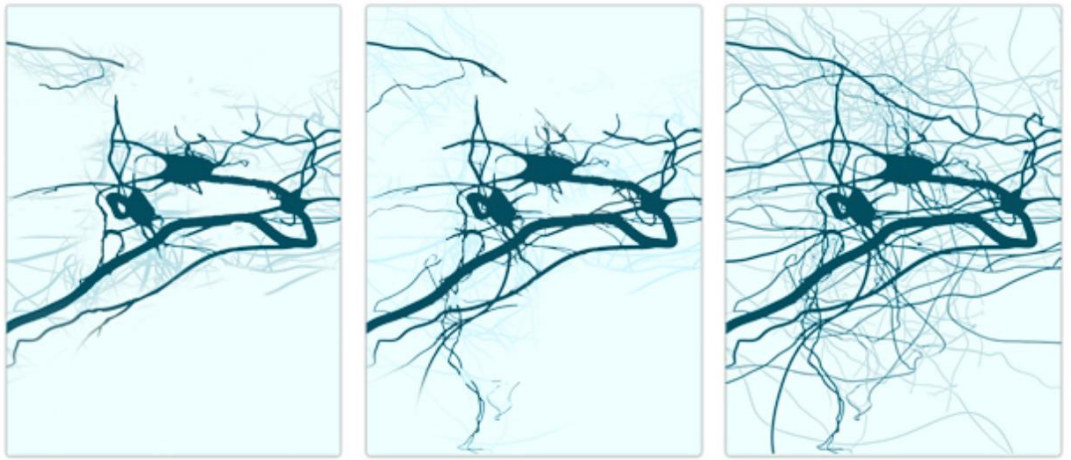
# Revisiting themes of neuroplasticity and resilience

# Dandelion and orchid children

- Why do some children have better outcomes than others despite having similar experiences?
- So called ‘dandelion’ and ‘orchid’ children suggest that some children are less reactive and more adaptive to circumstances than others

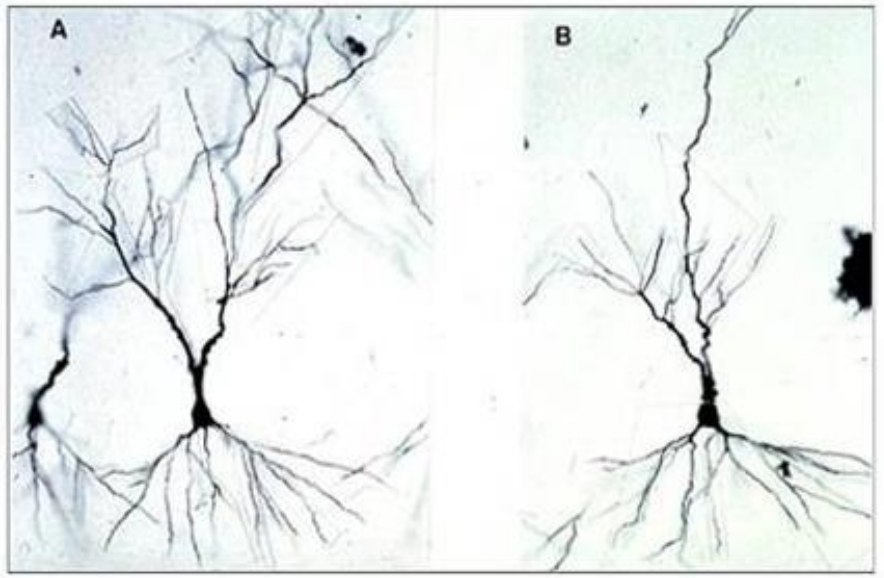
# Neuroplasticity

- Rather than early years determinism, brain architecture continues to show plasticity throughout adult life
- Studies of gene expression and epigenetic regulation reveal a dynamic and ever-changing brain (McEwen *et al*. 2015)
- The mediators of brain plasticity involve the same molecular and cellular processes as stress responses



# Resilience and stress

- Resilience is notoriously difficult to define but often means “achieving a positive outcome in the face of adversity”
- Animal models suggest that chronic stress can impair neurogenesis causing shrinkage in neuronal connections
- But structural changes are **reparable** when stress is terminated in healthy animals (McEwen, Gray and Nasca 2015, McEwen 2017)



# Reversing adverse experiences?

- Although structural changes in the brain are alterable, there is no going back to a previous state of development
- Instead, a new set of possibilities emerges that offer opportunities for epigenetic influences
- Thus, interventions do not restore developmental events but rather produce new compensatory mechanisms (Caldji *et al*. 1998)

# Plasticity can be activated and fostered

- Animal models have shown that an “enriched environment” can repair the effects of maternal separation and stress exposure (Francis et al. 2002)
- Neurobiology confirms the potential for psychosocial interventions to **rehabilitate** people after early life trauma
- Rehabilitation is a care relationship!
- “Windows of plasticity”

# Fostering compensatory mechanisms

- Interventions may include cognitive-behavioural therapy, physical activity and programmes that promote social support, social integration and developing meaning and purpose in life (Ganzel and Morris 2011, McEwen and Gianaros 2011)
- Interventions designed to promote plasticity and slow decline, such as physical activity and positive social interactions, are also useful for promoting positive health and happiness (Ryff & Singer 1998, Singer *et al*. 2005)

# Not just social but “biosocial”

- Resilience is not simply a property of biology but also sociocultural systems in which people create ecologies for human flourishing
- Biological and cultural systems have co-evolved to create adaptive processes
- In the resilience literature, these processes are called **promotive** and **protective** mechanisms

# Protective mechanisms for child development

## Individual

- Agency
- Problem-solving
- Self-regulation
- Self-efficacy
- Hope, faith, optimism
- Meaning-making

## Pro-social

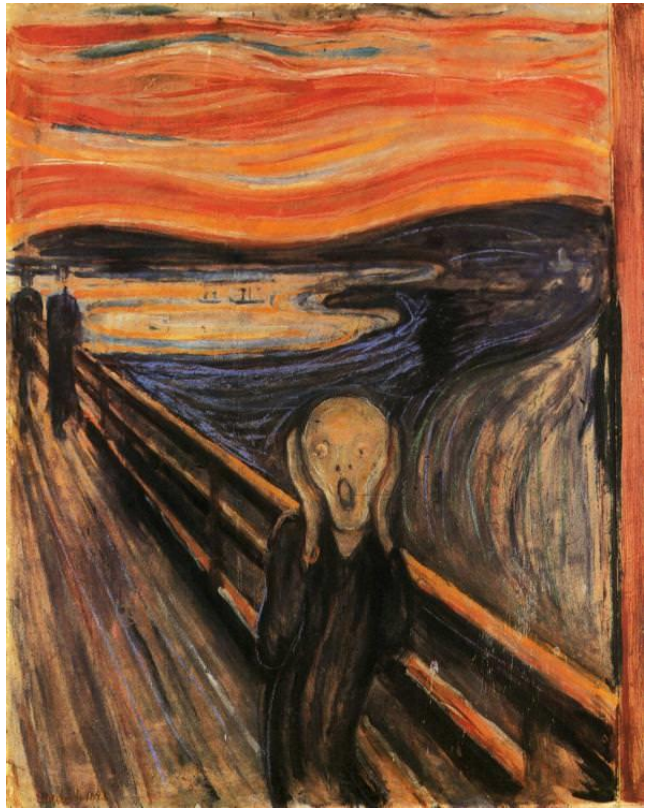
- Skilled parenting
- Sensitive caregiving
- Close relationships
- Routines and rituals
- Engagement in a well-functioning school
- Connections with well-functioning communities

Masten and Barnes (2018)

# Implications for the care system

# Implications for training

- Current focus on early removal of vulnerable children from adverse settings has created a “perfect storm” of policies oriented to early intervention and child protection (Featherstone et al. 2014)
- These arguments are bolstered by the selective use of neuroscience and epigenetics
- ACE awareness, trauma-informed care and the early years movement all trade in a discourse of infant determinism and biological fatalism



# Beyond the deficit model

- But neuroscience and biology can also be recruited to create a narrative of resilience and plasticity
- As well as identifying risk and vulnerability, practitioners can be trained to support families and to foster mechanisms of hope and human flourishing
- In other words, training also needs a narrative of “resilience-informed care”

# “Being connected” - the royal road to resilience

- If we adopt a biosocial stance then it becomes possible to argue that social networks promote brain plasticity and physiological resilience
- Social processes are “protective mechanisms” for healthy development (Rutter 1990)
  - Being connected reduces stress and illness
  - Being connected increases positive (mental) health
  - Being connected creates opportunities for self-esteem and self-efficacy

# A snap shot of a life in care

“You’re not comfortable in one place, you’re bound to move. You don’t know what to call home. I never stay in one place. I moved four times in the past years. It does affect you. You don’t know what to call home. Especially when you get into a relationship. It is hard to stay in one place. I moved from the time I was two, even before foster care. It has been unstable. I moved so much. I can’t stay in one place.”

Unrau et al. (2008) cited in Gilligan (2009)

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# Being connected is not enough…

- Children and young people also need stability and continuity
- Robbie Gilligan (2009) introduces five concepts to think about a secure base:
  - Responsiveness
  - Relationship
  - Reciprocity
  - Routine
  - Ritual

# Neurobiology and the care system

- In the age of neuroscience, everything social now passes through the brain
- But rather than use the brain sciences as a stick to beat families with, we should see it as a substrate on which to justify policies that promote resilience and human flourishing
- A condition of “being human” is to be loved and supported from which all the benefits of health, growth and capacity flow