

What is neuroscience telling us about supporting families?

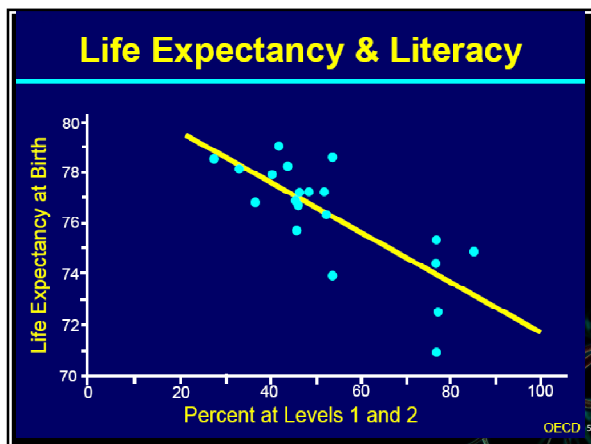
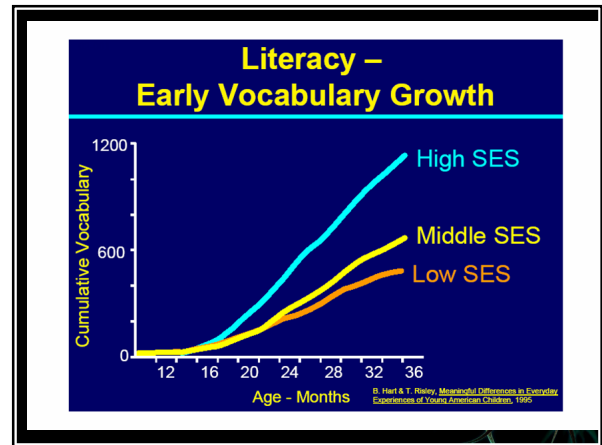
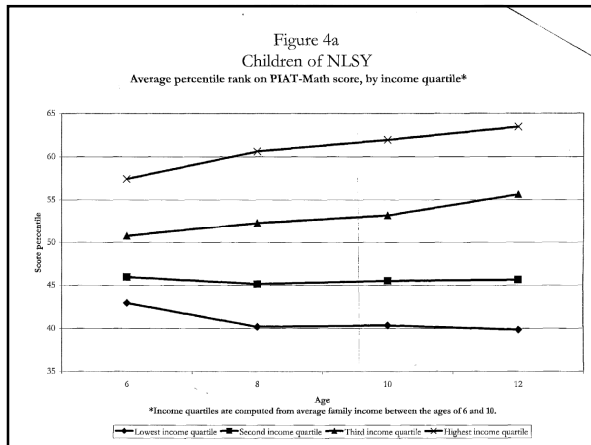
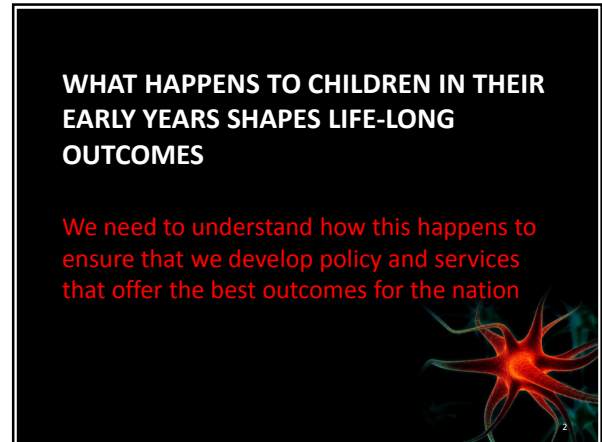
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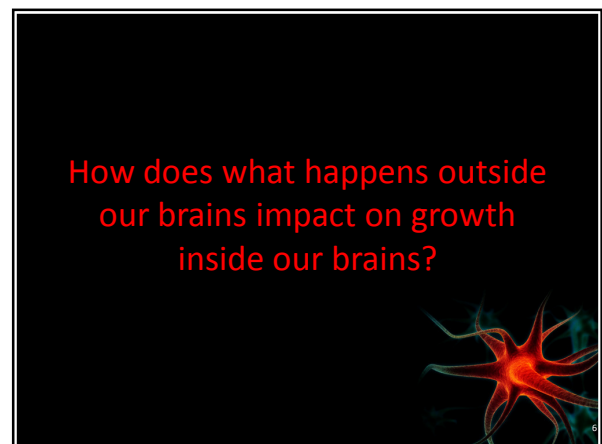


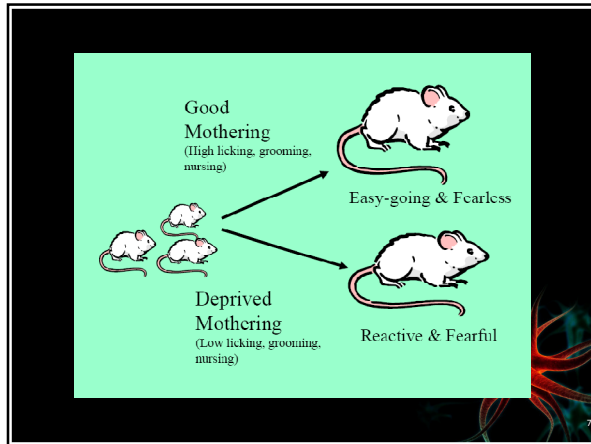
WHAT HAPPENS TO CHILDREN IN THEIR EARLY YEARS SHAPES LIFE-LONG OUTCOMES

We need to understand how this happens to ensure that we develop policy and services that offer the best outcomes for the nation



How does what happens outside our brains impact on growth inside our brains?





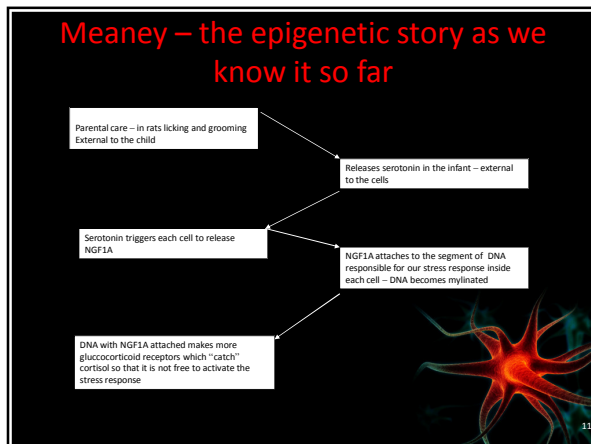
Rhesus monkeys – those who are genetically highly reactive

- Remain with poor mothers – disrupted sleeping, high cortisol levels, anxiety, depression, excessive alcohol consumption, aggression, poor mothering so inter-generational transmission of neglect/abuse
- Fostered with highly nurturing mothers had good outcomes – good social skills, robust immune responses, lower cortisol levels, females become nurturing mothers

The neurobiological argument is

- Parental care affects the activity of genes in the brain that regulate our stress responses
- ie parental care alters the chemistry of the genome
- Epigenetics – a functional change to the genome that does NOT involve a change in DNA sequencing but rather a change in the way in which genes are expressed

- Animals who were licked more produced fewer stress hormones when they were challenged or dealing with threats than those who were not licked
- ie their stress peaks were lower

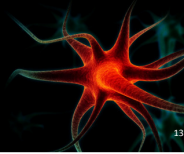


STRESS AND ATTACHMENT

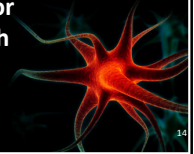
The underlying neurobiology

Telomere research

- Little 'caps' on the end of chromosomes
- Stress frays them so they shorten
- 1 year of high and chronic stress shortens telomeres in the same way as 6 years of aging
- Shorter telomeres associated with aging, cancer and other diseases



- Enzyme telomerase repairs damage
- Telomerase is increased in secure relationships
- Support groups and humour found to increase telomerase for mothers caring for children with disability



oxytocin

- The loving chemical
- Increase in OT before birth and lactation
- High levels of OT = more socially competent, more social interaction, increase emotional resilience and increased ability to handle stress
- Children with high levels of OT are curious, eager to make friends
- In new situations they are less anxious, more confident, more able to connect with others

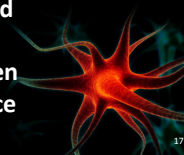


- In other words, high OT links to
- increased emotional resilience,
 - increased ability to handle stress and
 - decreased impulsivity



Mothers and OT

- Securely attached mothers had greater activation in the reward processing brain areas when they see their baby's smiling face and their baby's sad face
- Insecurely attached mothers had greater activation in the reward processing brain areas only when they see their baby's smiling face



- Autism associated with lower OT levels
- Can we change OT levels in adulthood? *The brain that changes itself* by Norman Doidge



Dopamine

- Reward chemical
- High levels lead to repeating behaviours
- Meaney – more licking/grooming creates more dopamine receptors so get more reward for social behaviours
- When associated with OT, dopamine hardwires the brain to see attachment as pleasurable and rewarding



In rats

- high levels of licking and grooming increases the number of dopamine receptors and increases dopamine production in mothers
- Separation from mother links to altered dopamine functioning throughout the lifespan



opoids

- Stop us experiencing pain and create feelings of elation
- Licking/grooming leads to more opoids and thus reduced pain
- Eg Opoids released in response to a cuddle can lessen the pain from a fall
- ie attachment protects us from pain
- In drug addicts, drug creates feelings of elation so the highs experienced from attachment are replaced by the drug



In summary, licking and grooming in rats

- Changes the methylation of the stress receptor genes resulting in a reduced stress response
- Changes in methylation of estrogen receptor genes resulting in a change in oxytocin functioning and enhanced maternal caregiving in female offspring
- Enhanced dopamine production in response to infant cues



Intergenerational transmission of these changes

Securely attached mothers

- Increased dopamine reward responses in the brain in response to infant's face
- Increase OT response when interacting with their infant
- More attuned in vocal communication with infant
- More likely to have securely attached infants



Insecurely attached mothers

- Decreased dopamine reward responses in the brain on seeing their infant's happy face
- Insula activation in response to their infant's crying face
- Less OT response when interacting with their infant
- Less attuned in their vocal communication
- More likely to have insecurely attached infants



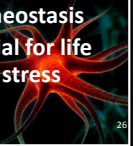
Eye contact at birth

- Dilated pupils immediately after birth caused by OT hit signal interest/focus on each other
- Activates the right orbital frontal cortex
- Causes a sympathetic nervous system arousal activated by adrenaline so infant becomes highly aroused



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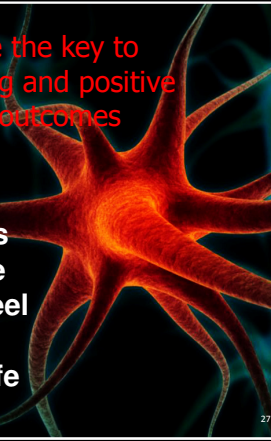
- Infants will avert gaze in order to lower their arousal level
- Parasympathetic nervous system kicks in to lower arousal
- Then will turn back and establish gaze raising SNS
- If adults support the establishment of gaze and accept the break the infant's sympathetic nervous system learns to establish homeostasis
- Ability to establish homeostasis essential for life long emotional regulation and manage stress



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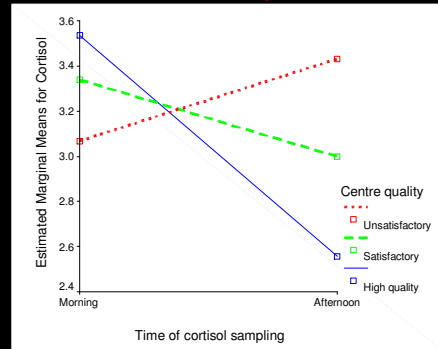
Relationships are the key to emotional well-being and positive developmental outcomes

High quality environments for children are places where children are loved, where they feel physically and psychologically safe



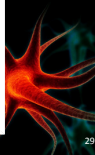
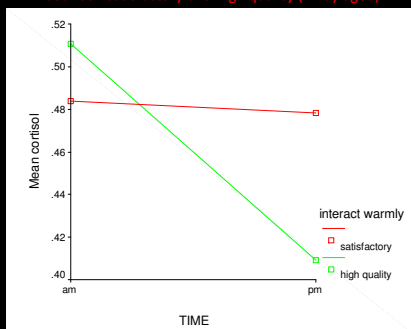
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Evidence from my research



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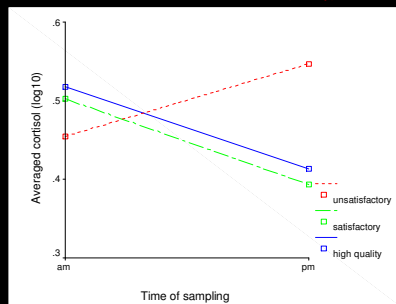
Principle 1.1 interact warmly - differentiation between satisfactory and high quality (kindy aged)



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Different pattern for programming / curriculum measures of quality

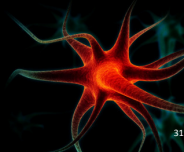
2.2 Individual needs (kindy)



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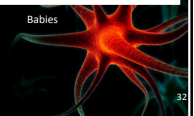
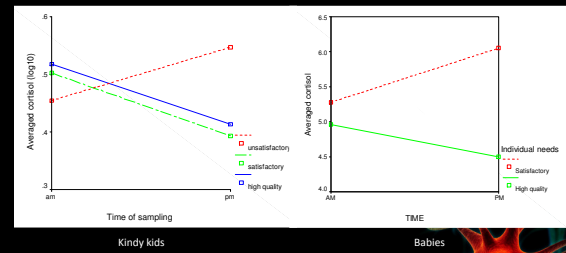
Infants and toddlers

- More likely to show increases in cortisol in satisfactory programmes
- ie more vulnerable to less than high quality



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Compare Principle 2.2 for kindy kids and babies



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Remember if children feel hungry, thirsty, sick, unloved, unsafe, unwanted, insecure, nervous

They will be biologically stressed which means

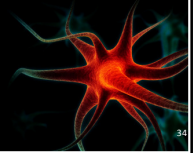
- They will not learn
- Exciting, challenging, developmentally appropriate activities will stress them more and lead to negative long-term outcomes



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Consequences of non-intervention

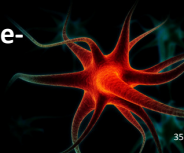
- aggression
- hypervigilance
- hypersensitivity
- hyperactivity
- Post Traumatic Stress Disorder
- mental health problems
- social isolation
- substance abuse
- suicide



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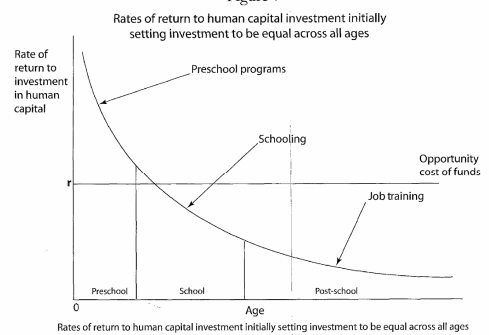
Is it ever too late?

- Brain research indicates **CRITICAL PERIODS**
 - connections made between neurons more easily during these times
- BUT**
- brain remains capable of re-organisation all our lives



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Figure 7



Rates of return to human capital investment Initially setting investment to be equal across all ages

There is enough money

5% of the money spent on military technology and training in 1999 could have provided basic education, health care, nutrition, potable water and sanitation to ALL the people of the world (Arias, 2000/2001)



We know what is needed

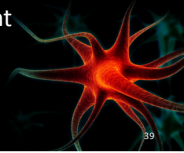
- Quality early childhood programmes that focus on learning in the context of secure relationships
- Quality family support programmes that empower parents and extended family members
- Quality communities that are places where parenting is valued and supported



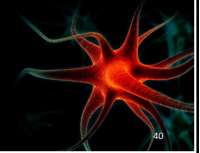
Crittenden (2008) advocates for an attachment approach in designing services to deliver these

DMM (dynamic-maturational model) proposes:

- From birth babies adapt to their parents and specific environment

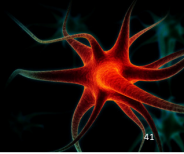


- When parents respond contingently infants learn to associate their behaviour with the response – ie crying leads to comforting
- infants are biologically aroused, they signal, their arousal levels drop – ultimately arousal levels drop in ANTICIPATION of the response



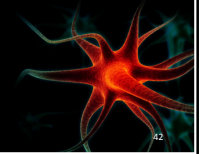
When parents fail to respond to infant distress and/or respond punitively and/or respond noncongruently (eg laugh at distress)

- Infants learn to hide their feelings
- Learn to inhibit their display of negative affect



When parents respond unpredictably but are comforting some of the time

- Infants cry more often and display more somatic distress
- Display mixed feelings combining desire for comfort with anger and fear
- Parents struggle to read mixed messages and tend to respond less contingently



- These types of attachment are often thought to be undesirable and extant intervention focuses on changing behaviours towards secure attachment

BUT

- These behaviours represent the infant strategy for eliciting needed caregiving and reducing possible harm



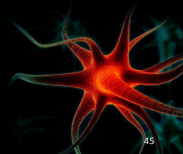
- Rather than changing the child we need to change the environment
- Create an environment in which the infant does not have to use these strategies and the attachment will change without further intervention
- Dysfunction is an interpersonal process marked by a lack of synchrony between vulnerable person and his/her attachment figures

Crittenden argues



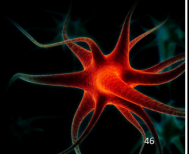
Danger is not associated with specific situations but occurs when children are exposed to a risk they

- Are not biologically mature enough to manage and
- Lack an attachment figure to protect/support them



The role of the attachment figure is to

- Support, guide and teach children the skills they need to manage
- Attachment operates within the child's ZPD so that strategies to support change as children develop
- Dysfunction happens when attachment figures operate outside the child's ZPD

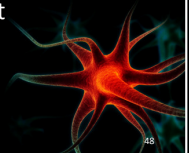


Using the DMM model to work with parents

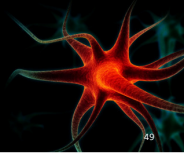
- Treatment of abusive/neglectful parents focuses on the dangers they experienced and the strategies they developed to manage these
- Frame these as accomplishments under difficult circumstances – ie work from strengths



- Work in parental ZPD
- Create new understandings of their behaviours which can lead to new ways of behaving
- Assess families not individuals - family functioning - independent and adequate; vulnerable to crisis; restorable; supportable; inadequate



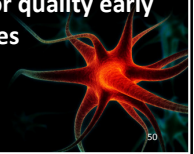
**HOW DO WE PERSUADE OUR
POLITICIANS TO VALUE AND FUND
WHAT WE NEED?**



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We ALL have a responsibility

- To explain how important the early years are to the wellbeing of a nation to other professionals, to community, to organisations, to the media and to politicians
- We need to create a demand for quality early childhood and parenting services



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- We need to demonstrate in our actions that we value early childhood/parenting
- We need to collect evidence of what works internationally and adapt this to our context
- We need to share our successes outside our own circles
- We need to be active and assertive
- We need to plan how we can all work together



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While one person can't move a mountain ... a well intentioned, well prepared group can build a mountain ... Though communication for social change they move mountains of apathy, mountains of hopelessness, mountains of cynicism ... buoyed by communication for social change principles and skill they can also build mountains of empowerment for those who have previously been voiceless or seemingly invisible
(Grey Felder, 2002, p1, cited in Anonymous, 2006, p. 1)



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