

A Conceptual Framework for Early Child Development: Implications for Policy and Practice

**Jane Barlow
Professor of Public Health
in the Early Years**

THE UNIVERSITY OF
WARWICK

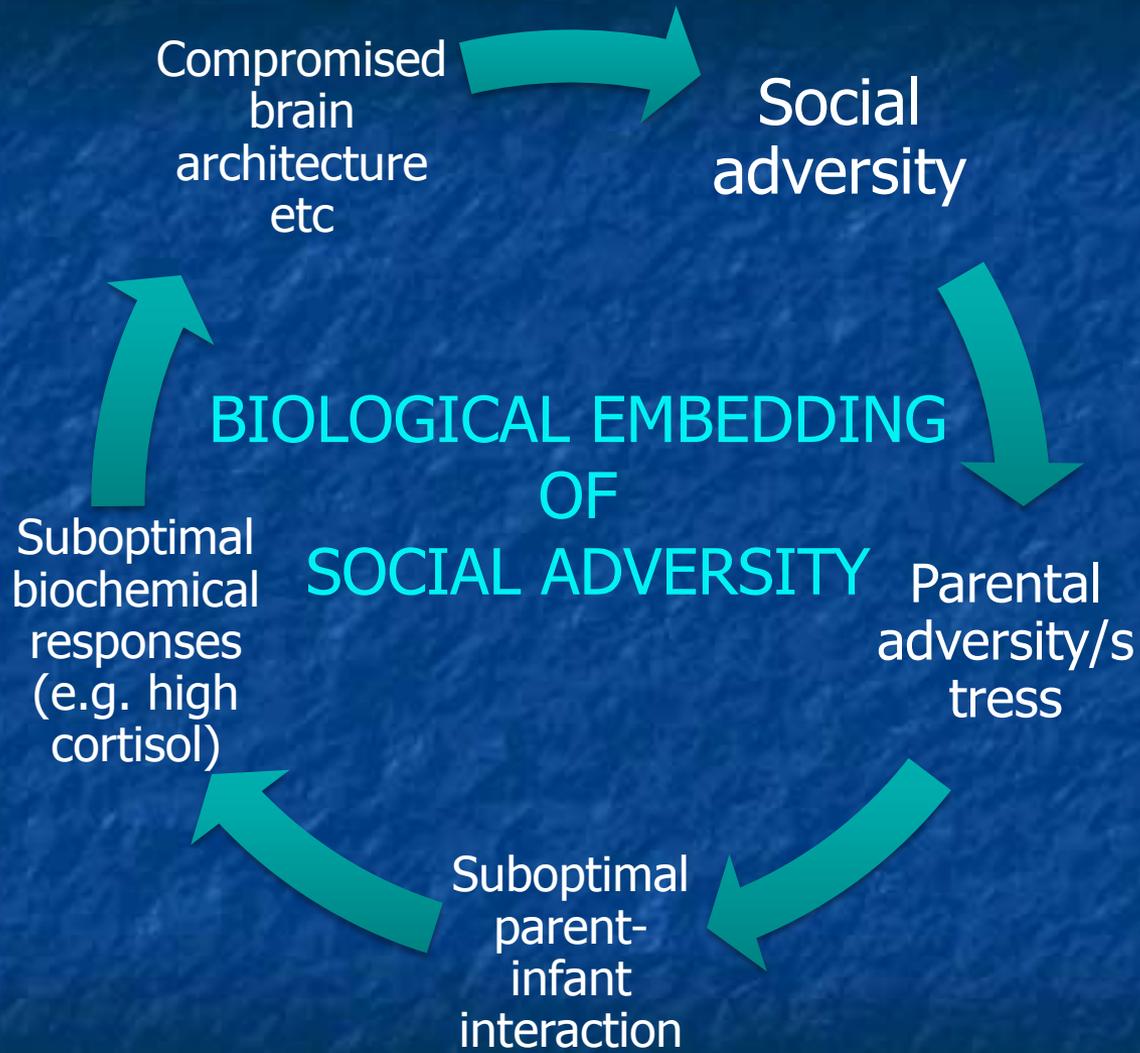
Focus of paper

- Conceptual model – biological embedding of social adversity
- Describe key components of model
- Discuss implications for policy and practice

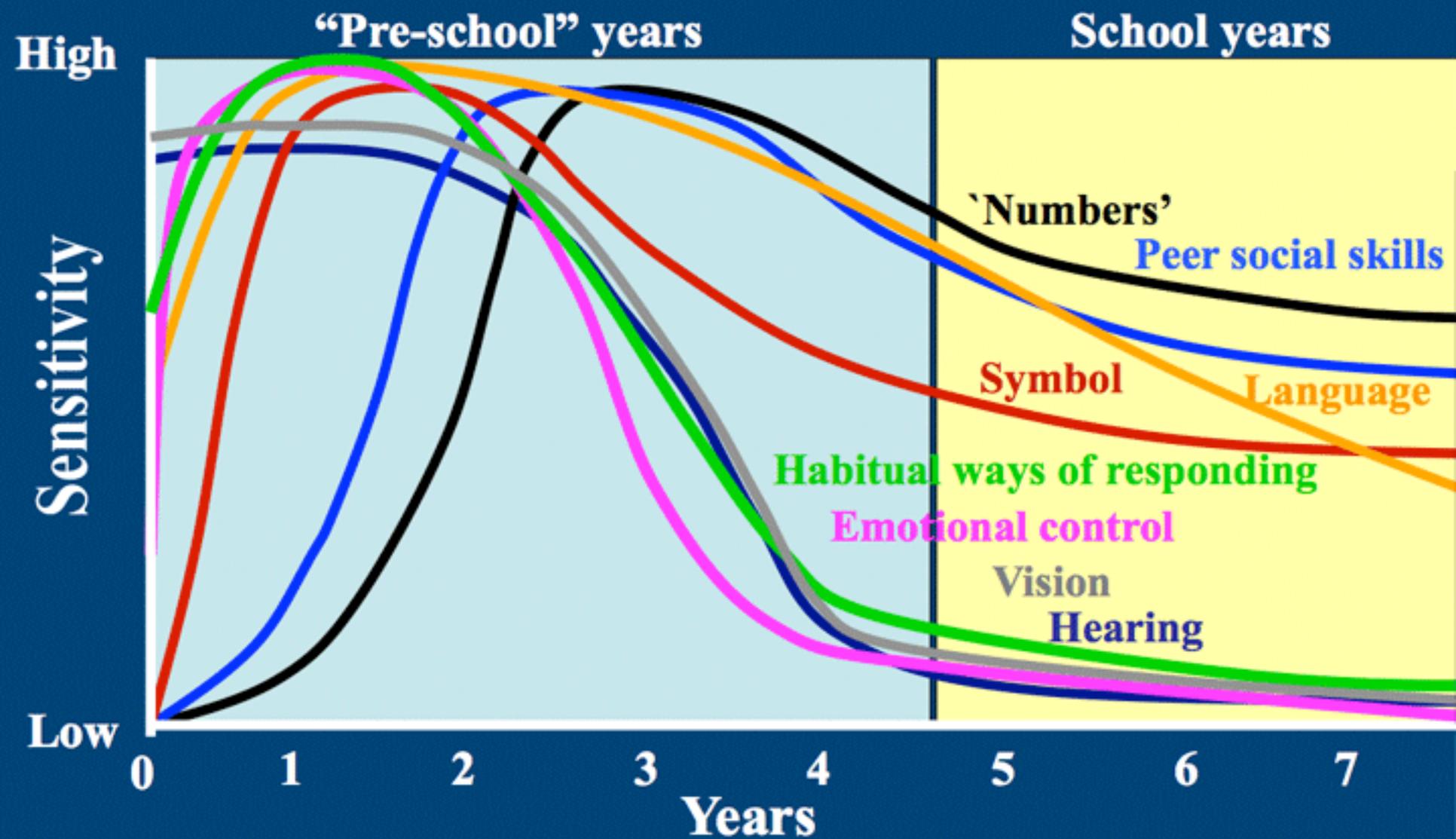
The Mechanism

- In order to equalise life chances we need to need to give every child the best start in life
- 2 key periods – pregnancy; first 2 years of life
- The reason: 'The biological embedding of adversities during sensitive developmental periods'

(Fair Society: Healthy Lives Marmot, 2010)

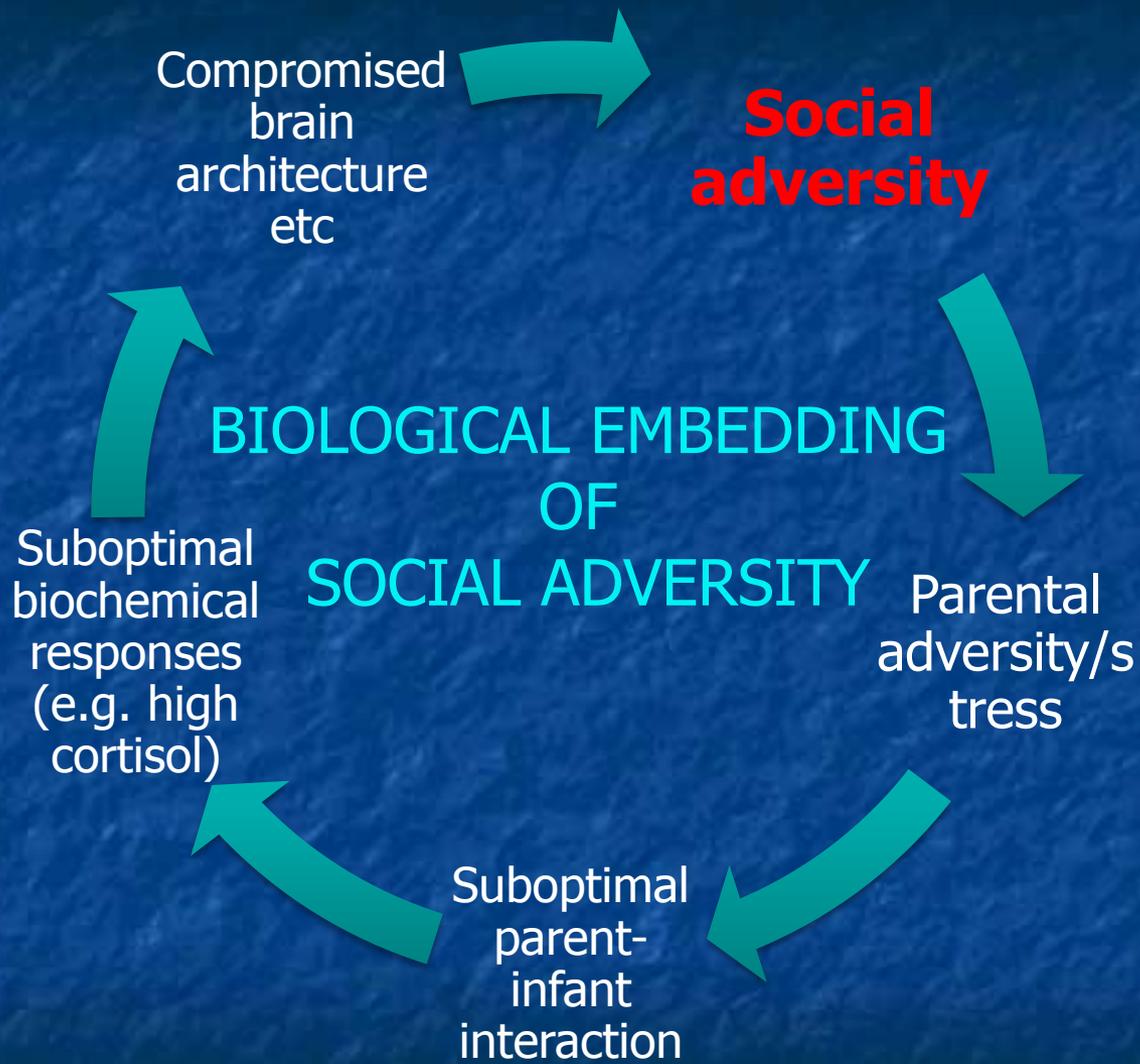


'Sensitive periods' in early brain development



Key aspects of child development

	<i>Social/Emotional competence</i>	<i>Intellectual Development</i>	<i>Behavioural Competence</i>
<i>Infancy</i>	Trust/attachment	Alertness/curiosity	Impulse control
<i>Toddlerhood</i>	Empathy	Communication/ mastery motivation	Coping
<i>Childhood</i>	Social Relationships	Reasoning/problem solving	Goal-directed behaviour
<i>Adolescence</i>	Supportive social network	Learning ability/achievement	Social responsibility



Definition of Poverty

- Main definition of relative poverty used in OECD and European Union is 60% of median household income
- 16.4 % of the European population is poor
- High variation across countries - 10% Netherlands and 21% in Romania
- Bulgaria – 20.7%

Impact of Social Adversity

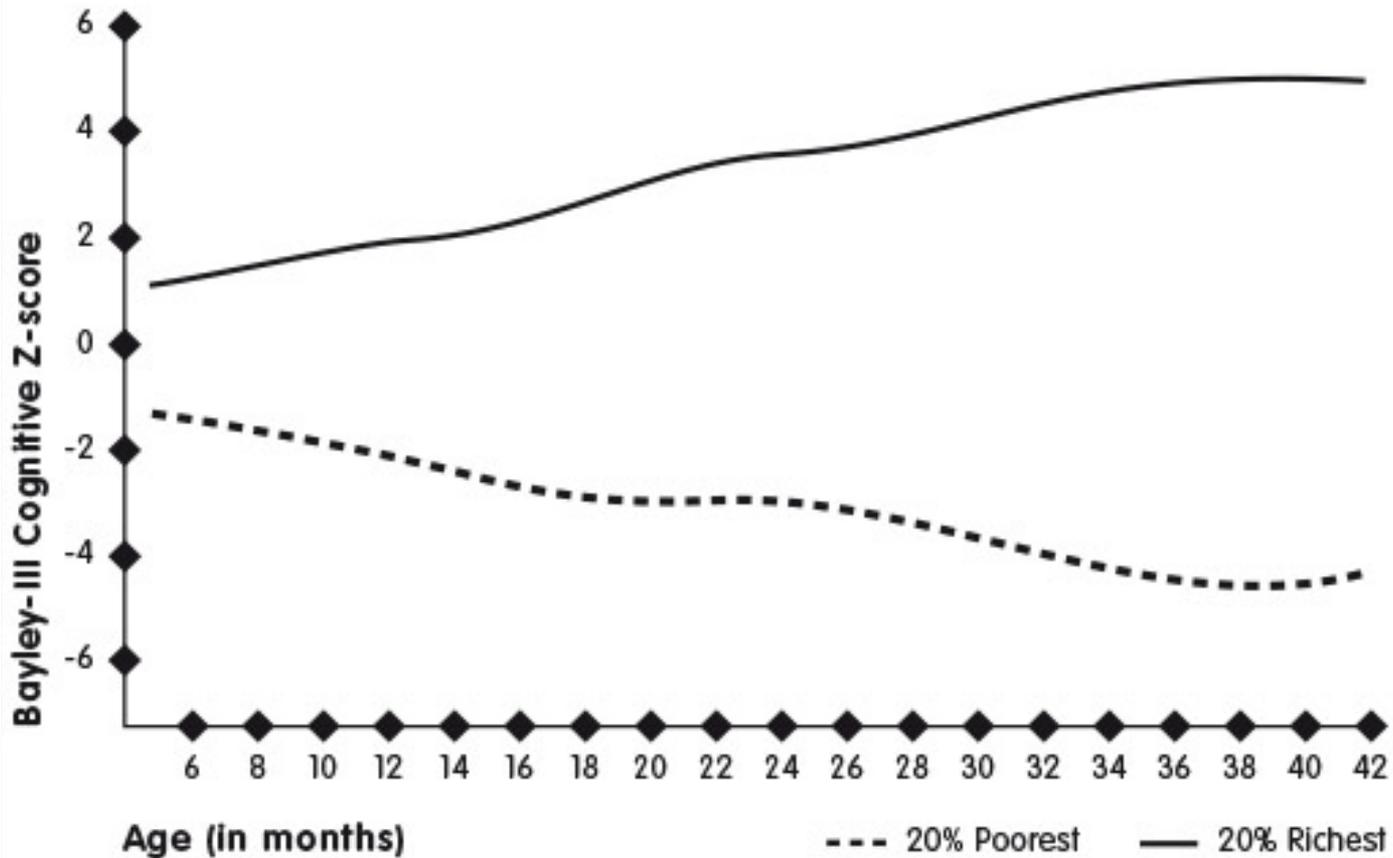
- Social adversity significantly influences all aspects of children's development.
- Two conceptual models to explain how this happens:
 1. Social Investment model
 2. Family Stress model

Social Investment model

- Low income has a **direct impact** on children's wellbeing and development, including their cognitive and behavioural development (Cooper and Stewart, 2013);
- Money enables parents to pay for better nutrition, educational resources including books and toys, housing and higher quality child care that further child development (Donkin et al, forthcoming)

Impact of poverty on learning

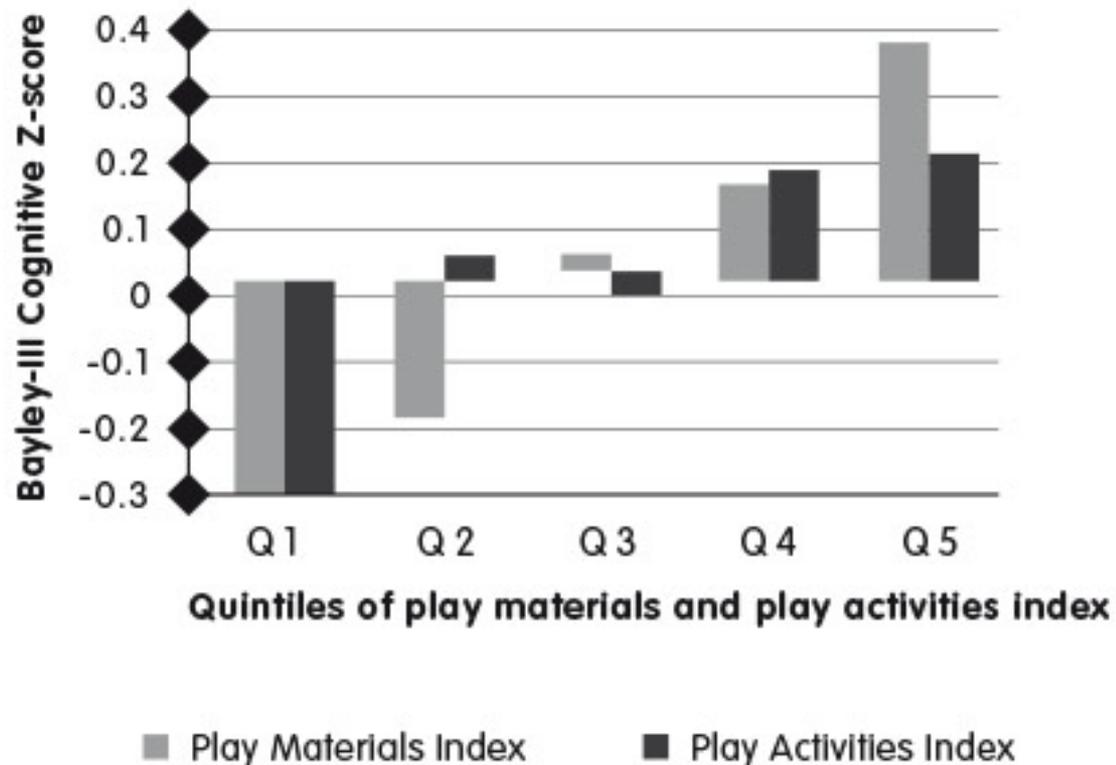
Figure 1 SES gap in cognitive development by age



Source: Rubio-Codina et al., 2013

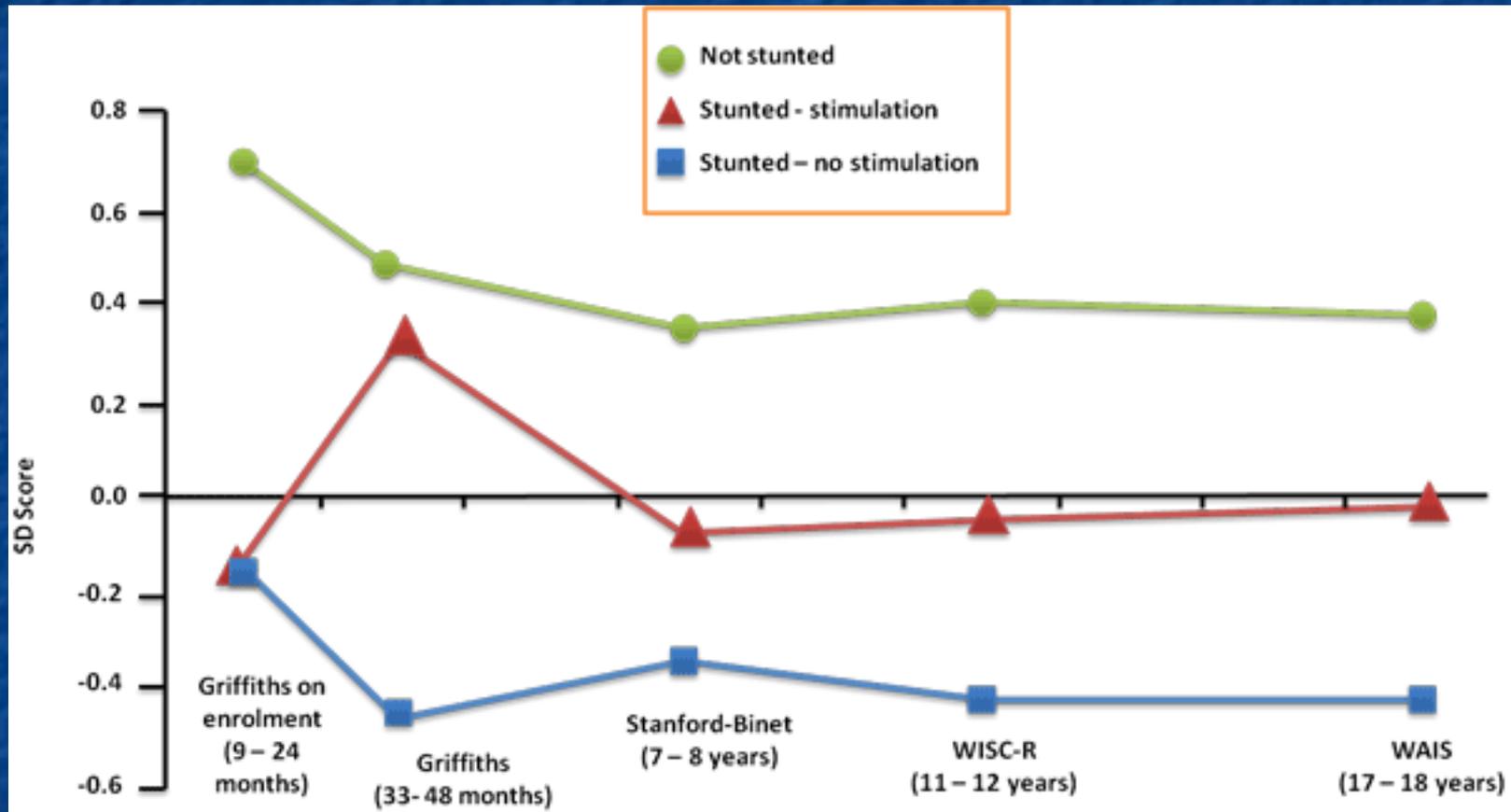
Poor Home Environment

Figure 2 Differences in children's cognitive development by quality of the home environment quintiles



Source: Rubio-Codina et al., 2013

Poor Nutrition



Poor nutrition & child development

- The 2008 Lancet series on Maternal and Child Undernutrition found that both poor foetal growth and stunting in the first two years of life were associated with lower school attainment and reduced economic productivity
- Stunting between 12 and 36 months was also linked to poor cognitive performance and/or lower school grades in middle childhood
- Both height and head circumference at 2 years were shown to be inversely associated with educational attainment

Compromised
brain
architecture
etc

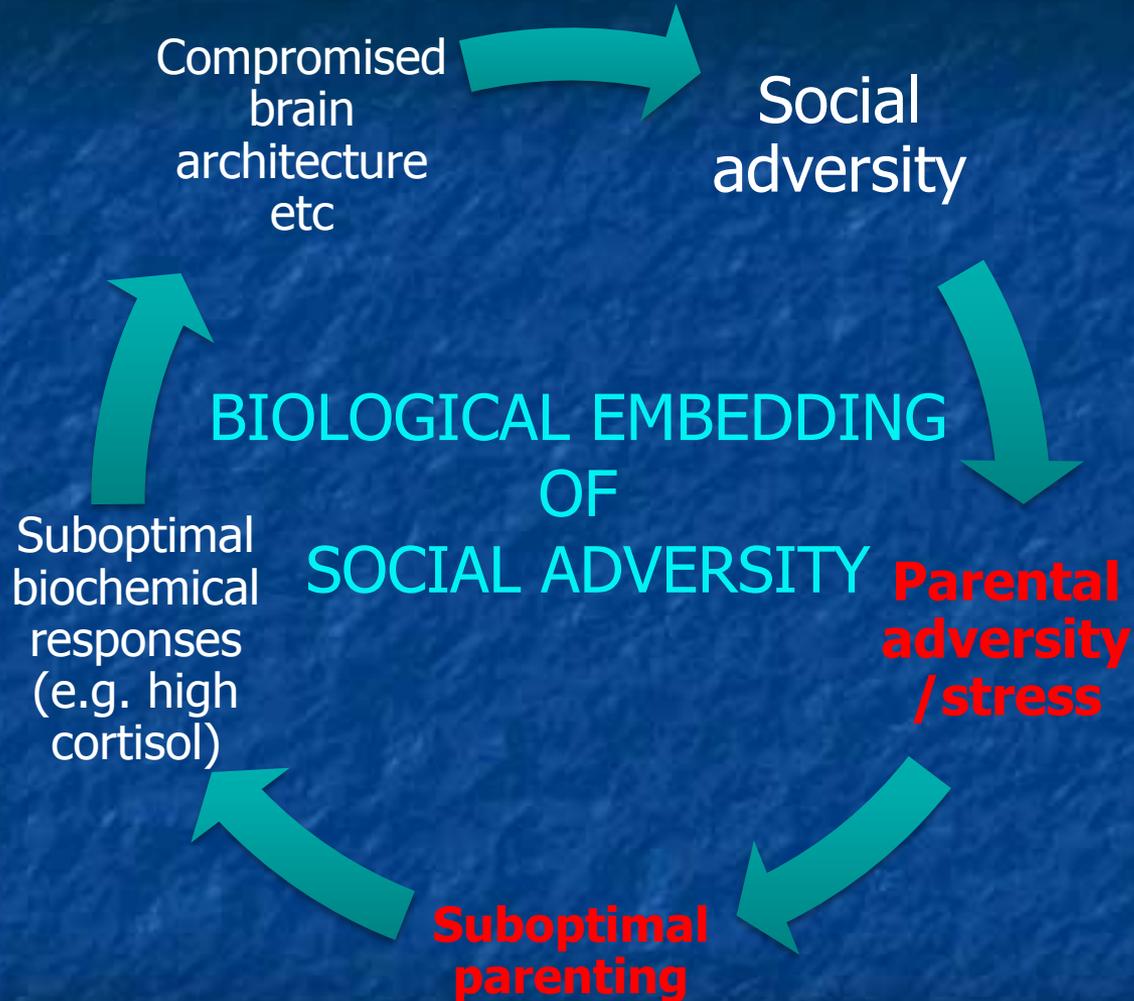
Social
adversity

BIOLOGICAL EMBEDDING
OF
SOCIAL ADVERSITY

Suboptimal
biochemical
responses
(e.g. high
cortisol)

**Parental
adversity
/stress**

**Suboptimal
parenting**



Family Stress Model

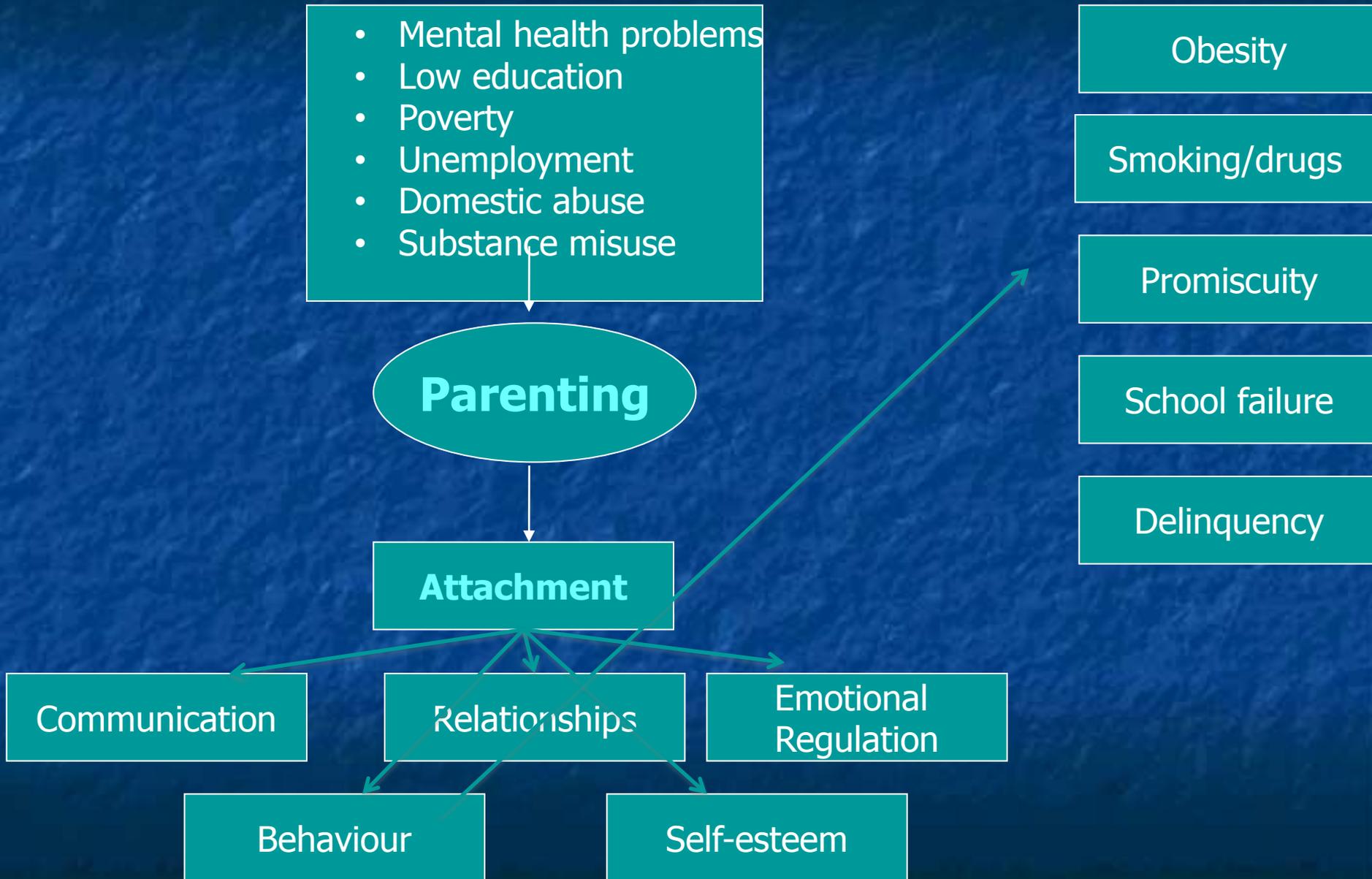
- Poverty strongly associated with:
 - mental health problems;
 - substance dependency;
 - domestic violence
- These are the key problems associated with parents being less able to provide optimal or 'good enough' parenting

The Importance of Parenting

Poor parenting strongly associated with:

- Poor nutrition: low birthweight; obesity in childhood;
- Insecure and disorganised attachment; increased emotional and behavioural problems; delinquency; substance-misuse etc.
- Poor school attendance; suboptimal educational outcomes; truancy etc

Parenting and later outcomes



Parent-infant interaction: Why is this important?

- Key task of infancy is 'affect regulation' – regulating stress levels
- Parents play a key role in facilitating this process, known as the 'dyadic regulation of affect'
- Two biological systems involved – parental caregiving and infant attachment
- Goal for most advanced societies should be to promote alignment of these two biological systems to promote 'secure attachment'

Atypical/Anomalous Parent-Infant Interaction

Disorganised Attachment - Inability to regulate emotions

Normal stresses of childhood

Unbearably painful emotional states

Retreat:

isolation
dissociation
depression

Self-destructive actions:

substance abuse
eating disorders
deliberate self-harm
suicidal actions

Destructive actions:

aggression
violence
rage

(Modified Robin Balbernie 2011)

Attachment

- Biobehavioural feedback mechanism
- Key strategy for regulating stress
- Requires the caregiver to respond sensitively when infant is distressed

Types of attachment

Secure (Group B) – able to use caregiver as a secure base in times of stress and to obtain comfort (55-65%)

Insecure

Anxious/resistant (Group C) – up-regulates in times of stress to maintain closeness (8-10%)

Avoidant (Group A) - down-regulates in times of stress to maintain closeness (10-15%)

Disorganised (Group D) – unable to establish a regular behavioural strategy (up to 15% in population sample; 80% in abused sample) (Carlson, Cicchetti et al 1989)

Parenting predicts attachment security

- Secure (Group B) – predictable, responsive, sensitive/attuned parenting
- Insecure
 - Anxious/resistant (Group C) – unresponsive, inconsistent
 - Avoidant (Group A) – rejecting, controlling, punitive
- Disorganised (Group D) – Fr-behaviour/Atypical parenting behaviours

Secure Attachment

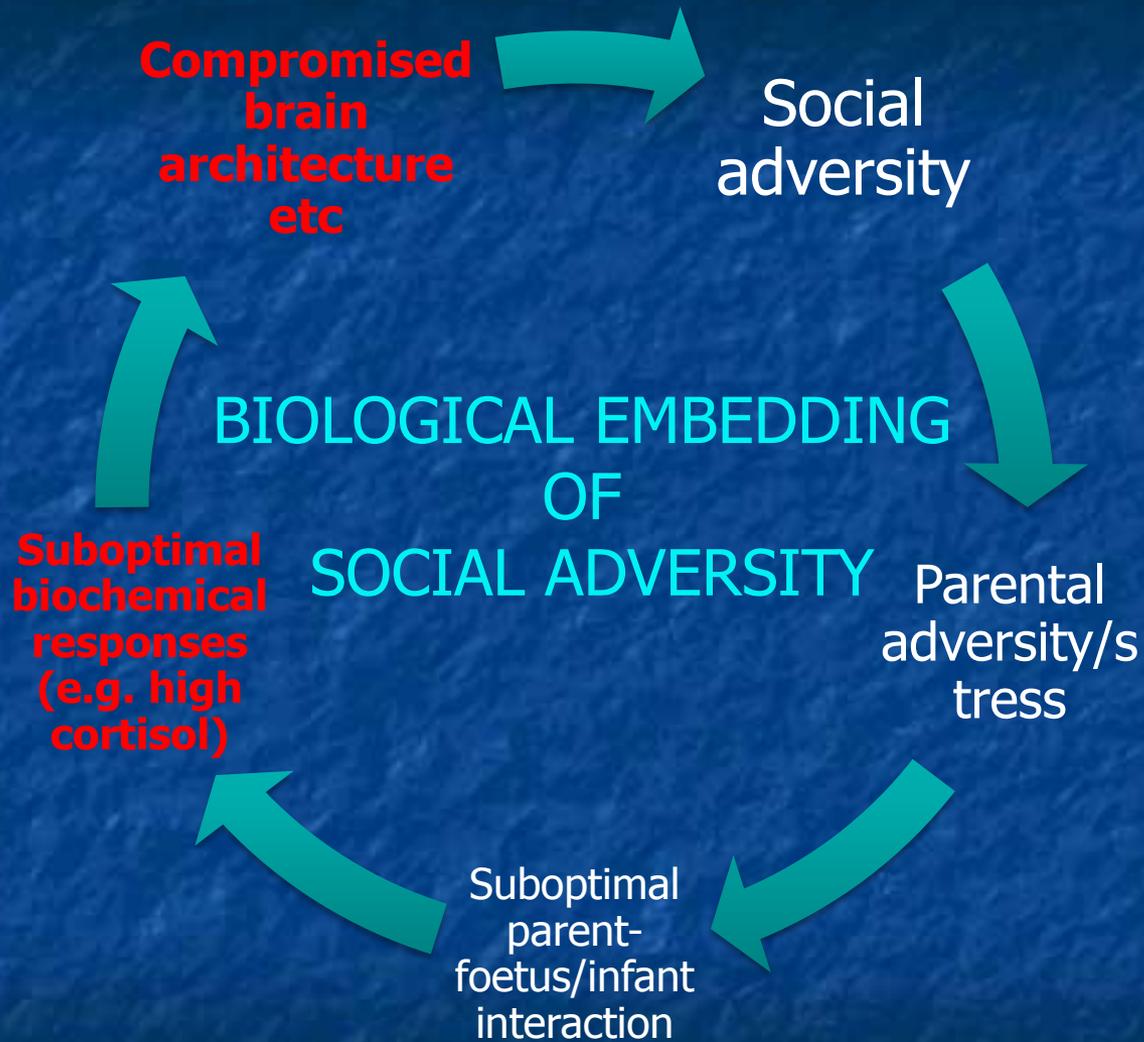
- Secure (Group B) – (55-65%)
- Longitudinal studies show that secure attachment in infancy is associated with optimal later functioning across a range of domains including scholastic, emotional, social and behavioural adjustment, as well as peer-rated social status (e.g. Berlin, Cassidy and Appleyard 2008; Granot, Mayseless 2001; Sroufe 2005).

Insecure Attachment

- Anxious/resistant (Group C) – (8-10%); Avoidant (Group A) (10-15%)
- Insecure attachment patterns associated with an increased risk of compromised functioning and can interfere with peer relations, intimacy, caregiving and caretaking, sexual functioning, conflict resolution, and increased relational aggression (Lecce 2008).

Disorganised Attachment

- Strong association between atypical behaviours and disorganised attachment at 12/18 months (Madigan et al 2006)
- Strong association between disorganised attachment at 12/18 months and later problems including severe psychopathology (Borelli et al 2010; Green and Goldwyn 2002)



The Infant's Brain - Neurochemistry

- Chemical neurotransmitters that have a direct affect on the brain e.g. neuropeptides such as Dopamine
- Early environment influences the production of these and thereby sets the thermostat for later control of stress response
- Excessive stress → brain flooded by Cortisol for prolonged periods → lowering of threshold for activation of fear/anxiety → more fear/anxiety and difficulty dampening this response
- Early relationships set the thermostat for later control of stress response

For example...

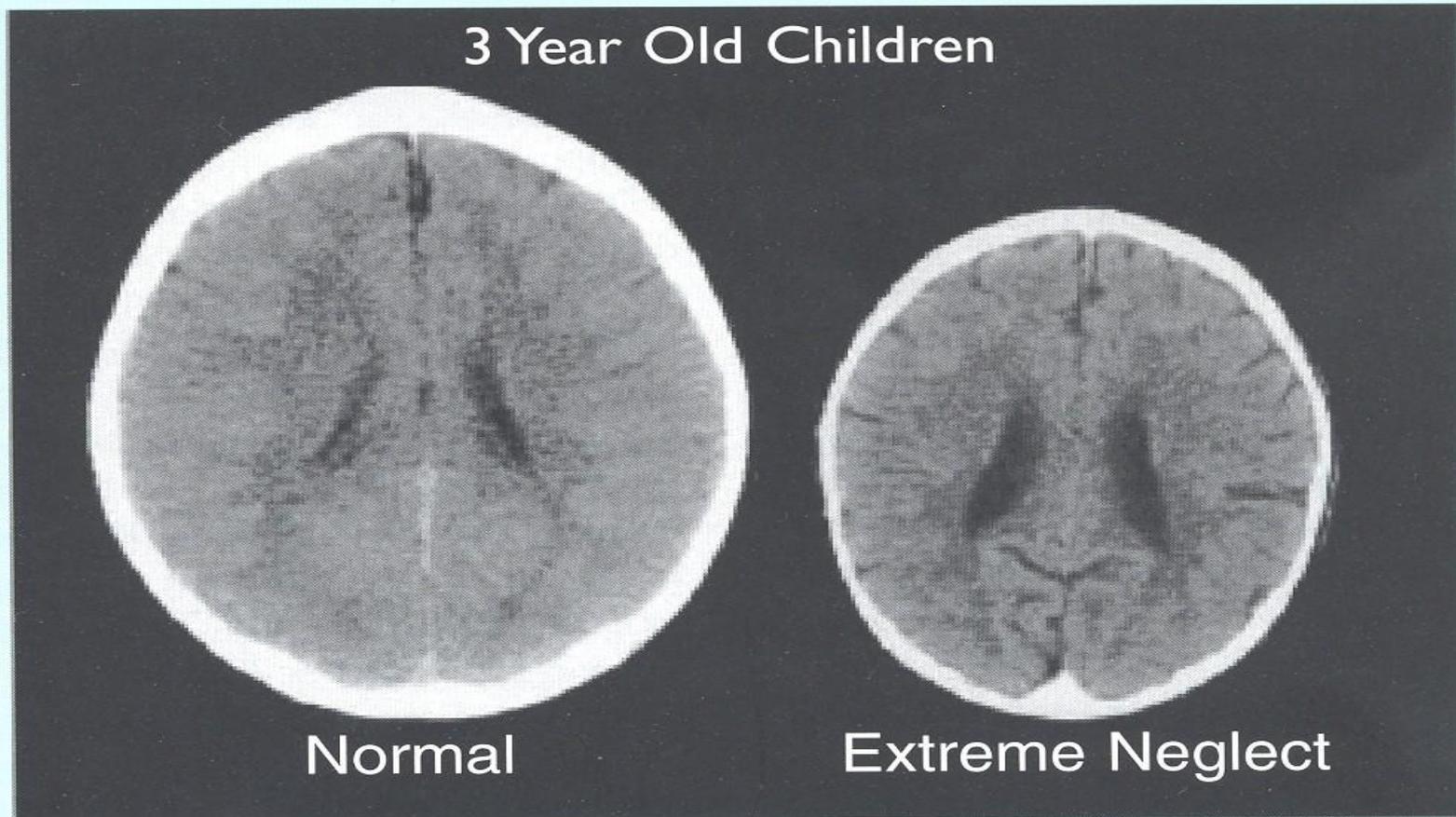
- **Looks and smiles** help the **brain to grow**
- Baby looks at mother; sees dilated pupils (evidence that sympathetic nervous system aroused and happy); own nervous system is aroused - heart rate increases
- Lead to a biochemical response - pleasure neuropeptides (betaendorphin and dopamine) released into brain and helps neurons grow
- Families doting looks help brain to grow
- **Negative looks** trigger a different biochemical response (**cortisol**) stops these hormones and related growth

(Gerhardt, 2004)

Impact of Early Life Stress

- Toxic Stress:
 - decreased brain volumes
 - dysregulation of the neuroendocrine stress response system, and *limbic dysfunction* involving regions such as the *hippocampus*, *medial prefrontal cortex*, and amygdala (Gunnar 2009)
- These neurobiological changes can result in:
 - development of short and long-term behavioural and emotional problems
 - increased risk for psychopathology and physical health disorders into adulthood (McEwan et al 2008)

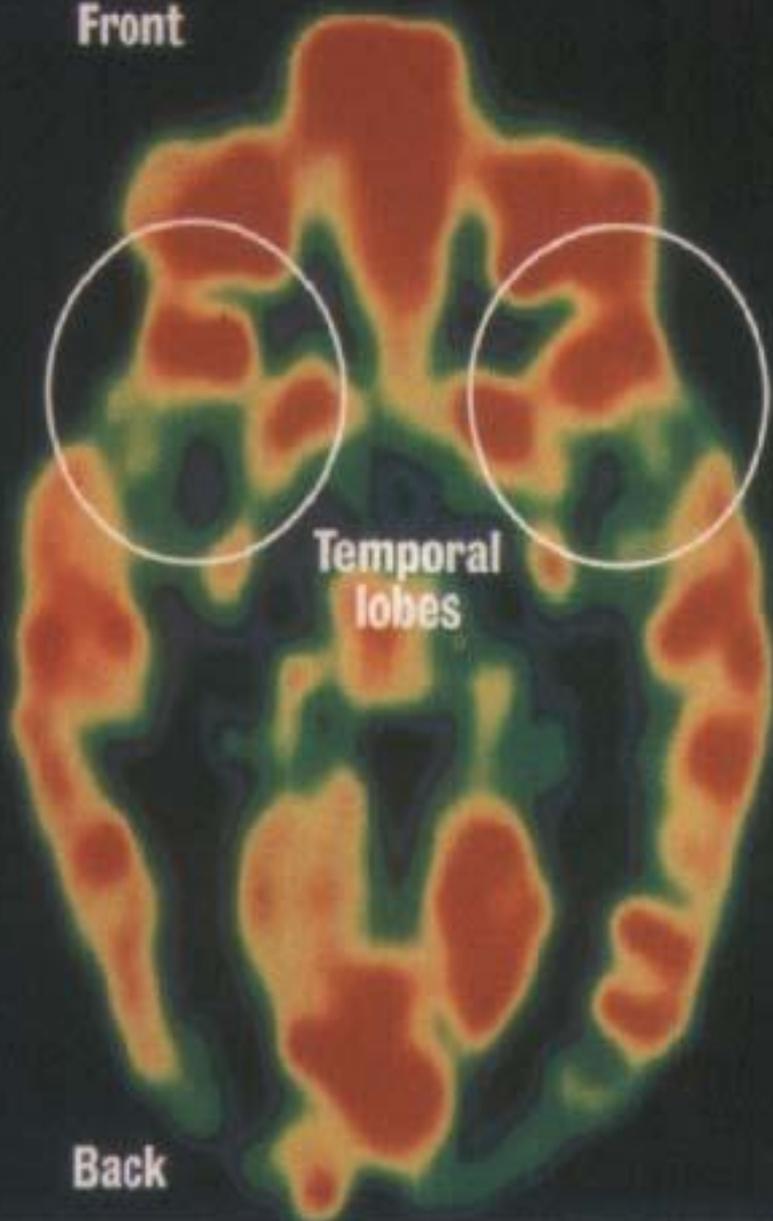
Figure 4.2: Differences in brain development following sensory neglect



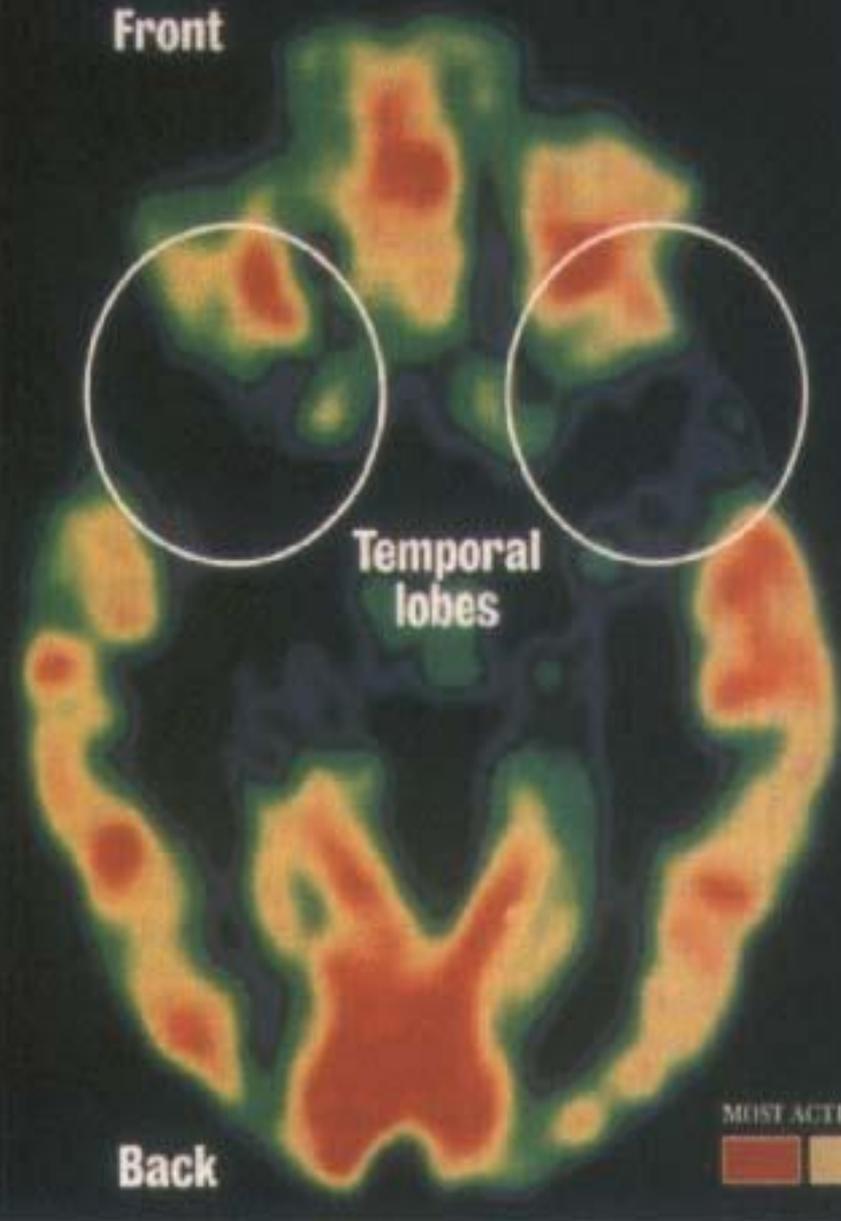
This figure compares the brain of a normal 3-year-old child (the image on the left) with the brain of a 3-year-old who has suffered severe environmental sensory-deprivation neglect (the image on the right). The child who has suffered neglect has a significantly smaller brain and has enlarged ventricles and cortical atrophy.⁴⁷

of
cor-
ys re-
ed)
and
At
ni-
such
em
ly
e-
m-
p).
d ex-
the

Front



Front



MOST ACTIVE

A color scale legend for brain activity, showing a gradient from dark red (most active) to light yellow (less active).

Consequences of Toxic Stress

Disrupts developing brain architecture and other organ systems and regulatory functions:

- Physiology – hyper-responsive/chronically activated stress response
- Behaviour – maladaptive responses to environment - EBP
- Learning - linguistic, cognitive skills compromised
- Increased stress-related chronic disease, unhealthy lifestyles and widening health disparities

(Shonkoff et al JAMA, 2009)

The Mechanism

- In order to equalise life chances we need to need to give every child the best start in life
- The reason: 'The biological embedding of adversities during sensitive developmental periods'
- 2 key periods – **pregnancy**; first 2 years of life

(Fair Society: Healthy Lives Marmot, 2010)



Foetal Programming

Nutrition in Pregnancy

- Maternal nutritional status influences the birthweight of the infant
- Low birthweight associated with later chronic health problems (CHD; Diabetes etc)
- Risk factors in the mother: that may contribute to low birth weight include teenage pregnancy, multiple pregnancies, previous LBW infants, **poor nutrition**, heart disease/hypertension; substance/alcohol misuse; poor prenatal care; environmental risk factors

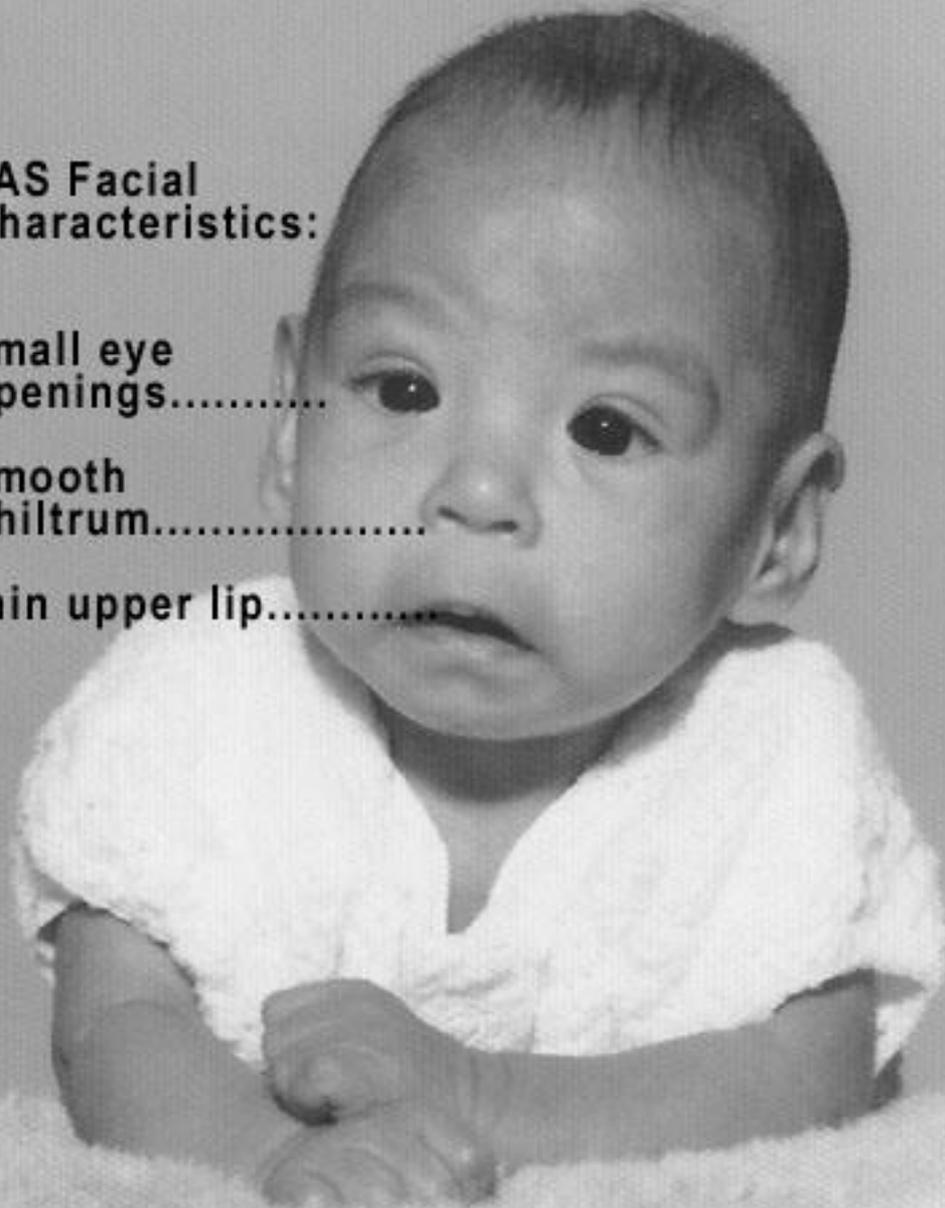
Baby with Fetal Alcohol Syndrome

FAS Facial
Characteristics:

small eye
openings.....

smooth
philtrum.....

thin upper lip.....





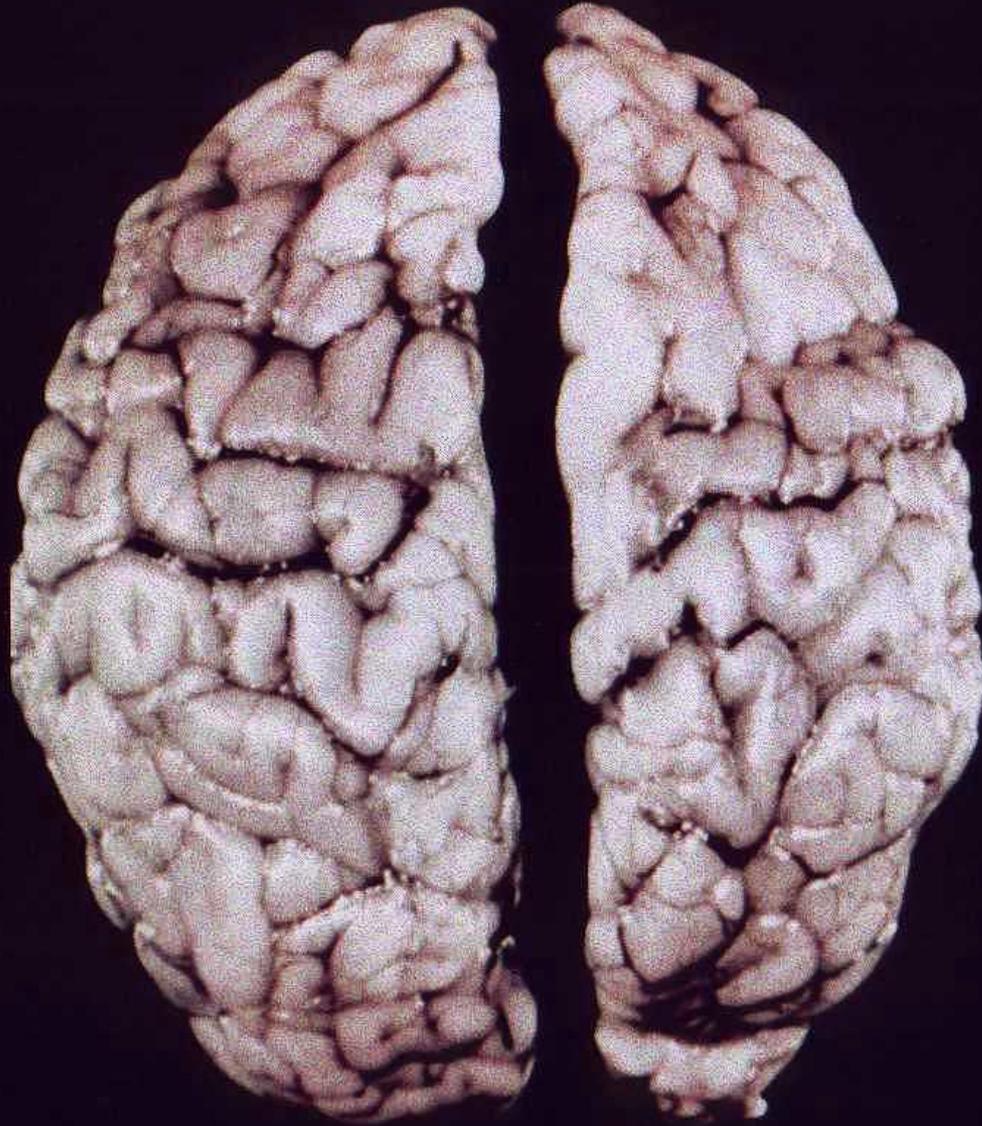
6-Week Old Baby
"Normal" brain



6-Week Old Baby
"Fetal Alcohol Syndrome" brain

Stress in Pregnancy

- Maternal anxiety and depression
- Pregnancy specific anxiety and daily hassles
- Bereavement and stress due to a relationship problems with the partner
- Exposure to acute external disasters (e.g. 9/11; Chernobyl; a Louisiana hurricane and war



6-Week Old Baby
"Normal" brain



6-Week Old Baby
"Fetal Alcohol Syndrome" brain

Neurodevelopment – post birth

- Neurodevelopmental functioning of newborns (NBAS) (Diego et al 2004)
- Temperament (Austin et al 2005; Buitelaar et al 2003;
- Sleep problems (O'Connor et al 2007)
- Cognitive performance and fearfulness (Bergman et al 2007)

Neurodevelopment – childhood

- Increased emotional problems (anxiety and depression), ADHD and conduct disorder (O'Connor et al 2002; 2003; Keleinhaus et al 2013; Rice et al 2010; Van Den Bergh & Marcoen 2004; Rodriguez & Bohlin 2005; Beversdorf et al 2005)
- Reduced cognitive performance (Laplante et al 2008; Mennes et al 2006)

Physical and Physiological Outcomes

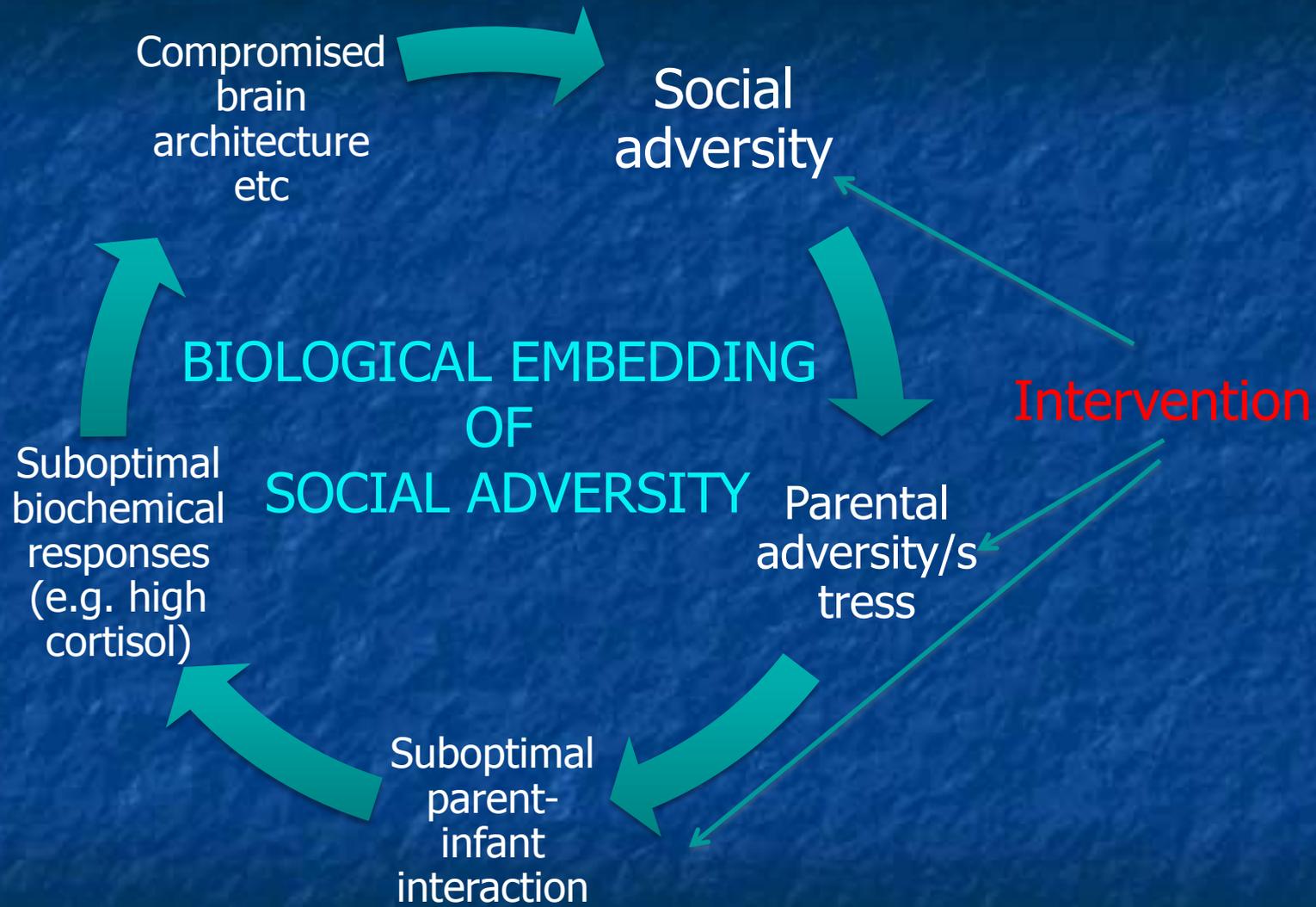
- Congenital malformations (Hansen et al 2000)
- Lower birthweight and reduced gestational age (Rice et al 2010; Wadhwa et al 1993)
- Altered sex ratio (Obel et al 2007; Peterka et al 2004)
- Regional reductions in brain grey matter density (Buss et al 2010)
- Altered diurnal pattern or altered function of the HPA axis (Glover et al 2010)

Clinical Magnitude - EBD

- Women in top 15% for anxiety, child had double risk for emotional and behavioural problems at 4 and 7 years (O'Connor et al 2002; 2003)
- Population attributable risk of such problems due to prenatal stress 10 – 15% (Talge et al 2007)

Clinical Magnitude - Cognition

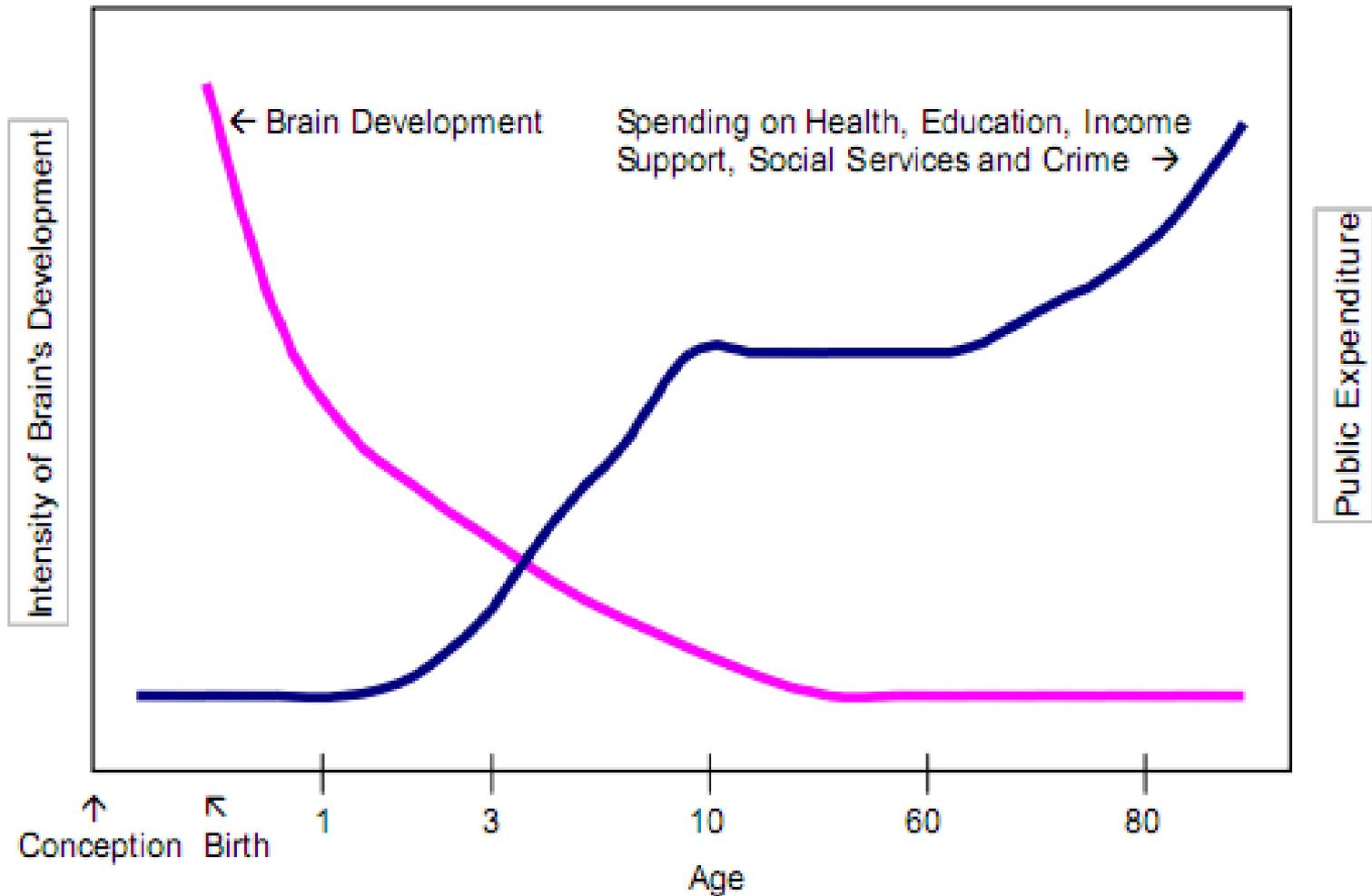
- Prenatal stress accounted for 17% of variance in cognitive ability at 17 months (Bergman et al 2007); mean Bayley MDI of 89 compared with 98
- Exposure to Canadian Ice Storm in pregnancy in 1st/2nd trimester – Bayley scores 14 and 19 points lower (King and Laplante 2005)



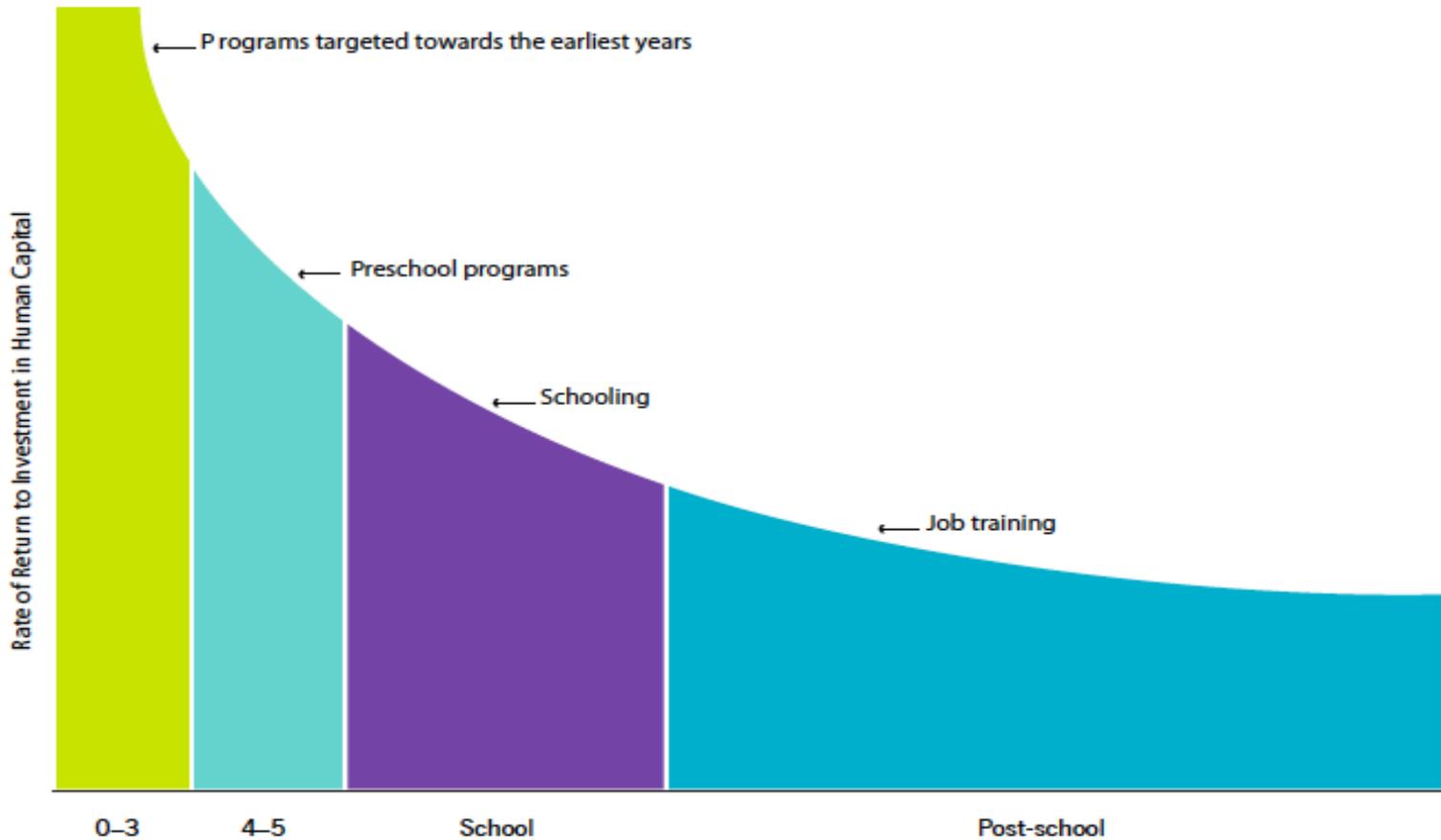
Implications for Policy and Practice



Current public expenditure relative to brain development



Returns per annum per unit dollar invested

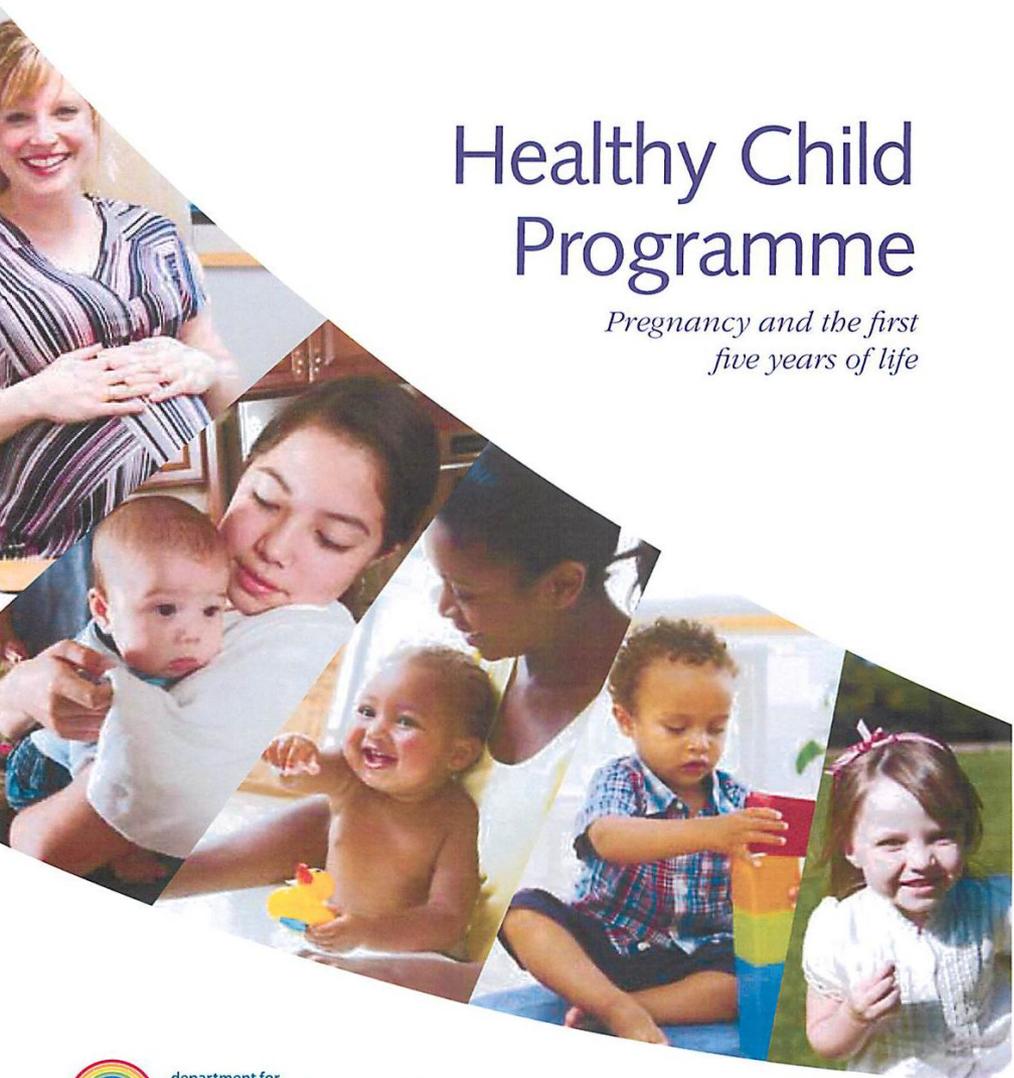


Fiscal Policies

- Welfare to Work Schemes – (e.g. New Hope – programme with community-based jobs; training; help with job searches; monthly income supplements; child care subsidies etc)
- Tax credits – (e.g. child tax credits)
- Family benefits – (e.g. child benefit payments; parenting payments)

Healthy Child Programme

*Pregnancy and the first
five years of life*



**Healthy Child
Programme:
begins in
pregnancy and
targets all
aspects of
early
development**

Promoting Nutrition

Nutrition 1

- Nutritional status of mother in pregnancy important
- Avoid low birthweight babies – good dietary intake; stop smoking and drinking; promote exercise
- Promote breastfeeding immediately following birth and exclusively six months – breast buddies;
- Supplements for women breastfeeding

Nutrition 2

- Provide children in early years settings and schools with meals (e.g. breakfast and lunch)

**Promoting
Socioemotional
development**

Support in Pregnancy

- Preparation for parenthood classes
- Promote the relationship with developing foetus/unborn baby – third trimester
- Identify women with additional needs:
 - chronic stress/depression;
 - domestic abuse; substance dependency; severe mental health problems

Birth

- Support during labour (e.g. partner; doula)
- Skin-to-skin contact and breastfeeding
- Parents and baby roomed together
- PTSD screen
- Early discharge and visits by community midwife/health visitor

Early Infancy

Promoting bonding and empathic caregiving

- Infant carriers
- Infant massage classes
- Parenting programmes
- Intensive home visiting

Identification of problems (PND; intrusive parenting etc)

- Promotional interviewing
- Listening visits

Introducing parents to their 'Social Baby'

- Promote closeness and sensitive, attuned parenting
(e.g. Skin-to-skin care and the use of soft baby carriers; infant massage etc)
- Provide parents with information about the sensory and perceptual capabilities of their baby (e.g. *The Social Baby* book/video or *Baby Express* newsletters) or validated tools (e.g. Brazelton or NCAST)

Providing Guidance

- Anticipatory guidance:
 - practical guidance on managing crying and healthy sleep practices e.g. bath, book, bed routines, and activities
 - *encouragement of parent–infant interaction* using a range of media-based interventions
- Can lead to significant improvements in parents' routines with children

Reviewing Developments

- We know more about how to intervene effectively when children are toddlers than when they are adolescents;
- Many later problems emerge during the early years
- Regular early reviews of development are a key part of progressive universalism:
 - New baby review;
 - Health review at 6-8 weeks and 1 year;
 - Two year review

Additional intervention

- **Sensitivity/attachment-based:** *Video-Interaction Guidance; Circle of Security*
- **Psychotherapeutic:** Parent-infant psychotherapy
e.g. *Watch, Wait and Wonder*
- **Mentalisation:** *Minding the Baby* Programme
- **Parenting programmes** – *Parents under Pressure*

Preventing Emotional and Behavioural Problems

- Group-based parenting programmes: Nurseries (e.g. Mellow Babies) and schools
- Examples of programmes – Triple P; Webster-Stratton; Parent-Child Interaction Therapy; Circle of Security (attachment problems)

Promoting Early Learning

Promoting Early Development

- Should start from the first weeks and months
- Encouragement to use books, music and interactive activities to promote parent–baby relationship and thereby development

Disadvantaged families:

- Group-based interactive support (e.g. PEEP) in nurseries and baby clinics etc.

Supporting Parents

- Use of standardised evidence-based programmes for disadvantaged parents (e.g. Olds FNP)
- Parent involvement in dance, song, creative activities, pretend play
- Parental sensitivity to early communications; turn taking; mirroring of emotions
- Development of narratives and personal stories (i.e. retell experiences of day etc; story-telling; role-play)
- Parental naming of emotions
- Play-based activities and routines

Centre-Based Care

High-quality centre-based care key to promoting early learning:

- Key worker for each child;
- Low child to staff ratio
- Training and qualifications of staff

Key Messages

- Early development is key to children's later wellbeing
- Significant expenditure during pregnancy and the first three years of life will reap exponential rewards
- Public health approach involves the delivery of both universal and targeted interventions

Key Reading

- Chief Medical Officers Report (2012): Our Children Deserve Better

<https://www.gov.uk/government/publications/chief-medical-officers-annual-report-2012-our-children-deserve-better-prevention-pays/>