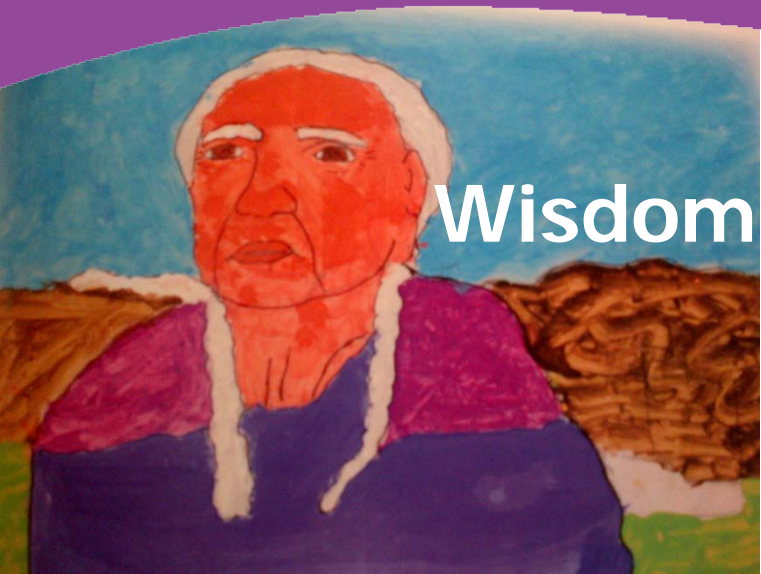


The Importance of Early Childhood Development (ECD) and How Our Aboriginal Children Are Doing

Dr. Rob Santos





Wisdom from the Kids at Sister Mac

If you're not from the inner city you don't know wisdom, you can't know wisdom.

The responsibility to take care of others.

Using your power for good.

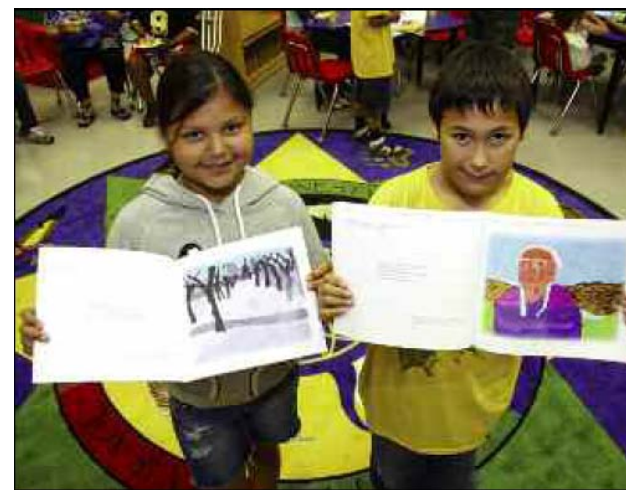
Choosing wisely between nice and bad.

Courage just to be you.

Courage to stand up for others.

If you're not from the inner city you don't know wisdom, you can't know wisdom.

–Tristen (pp. 22-23)



REVERSING THE REAL BRAIN DRAIN

Early Years Study

Final Report



April 1999

Co-chairs: Hon. Margaret Norrie McCain & J. Fraser Mustard

EARLY YEARS STUDY 2

Putting Science into Action



EDITED BY
Hon. Margaret Norrie McCain
J. Fraser Mustard
Dr. Stuart Shanker

Early Years Study 3

Making decisions
Taking action



HON. MARGARET NORRIE MCCAIN
J. FRASER MUSTARD
KERRY MCCUAIG



Dr. Fraser Mustard
(1927-2011)



Strini
Reddy

A “Womb with a View” ... Brain Development in Progress:



*By age 3 years, a
young child's brain is
apt to be more than
TWICE AS
ACTIVE as that of
his or her
PEDIATRICIAN
(or any other adult)*

Sources:

Gopnik, Meltzoff, & Kuhl, 1999; Shore, 1997



**LIFELONG
HEALTH**

ECD

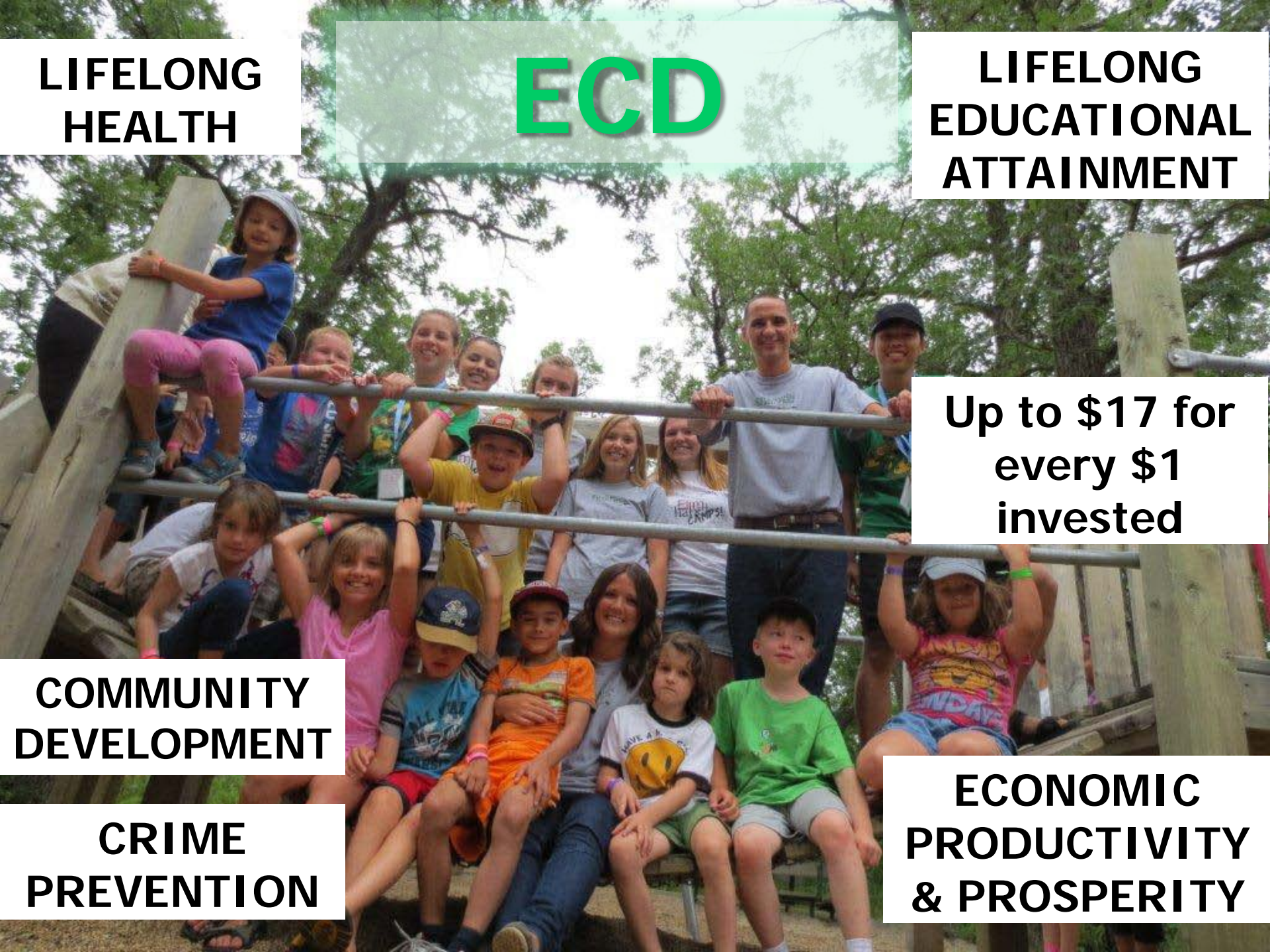
**LIFELONG
EDUCATIONAL
ATTAINMENT**

**Up to \$17 for
every \$1
invested**

**COMMUNITY
DEVELOPMENT**

**CRIME
PREVENTION**

**ECONOMIC
PRODUCTIVITY
& PROSPERITY**



Three Core Concepts in ECD:

1. Experiences Build Brain Architecture video (1:56)



<http://www.youtube.com/watch?v=VNNsN9IJkws&list=UUhBjCaJyswxSEqz26TZrWRw&index=5&feature=plcp>

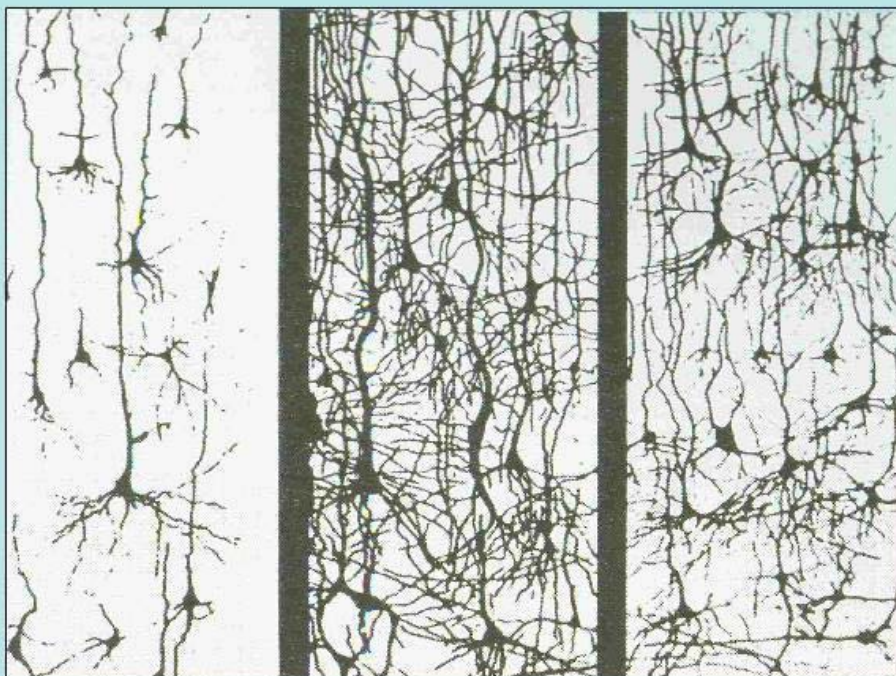
Experience Shapes Brain Architecture by Over-Production of Connections Followed by Pruning

Synaptic Density

At birth

6 years old

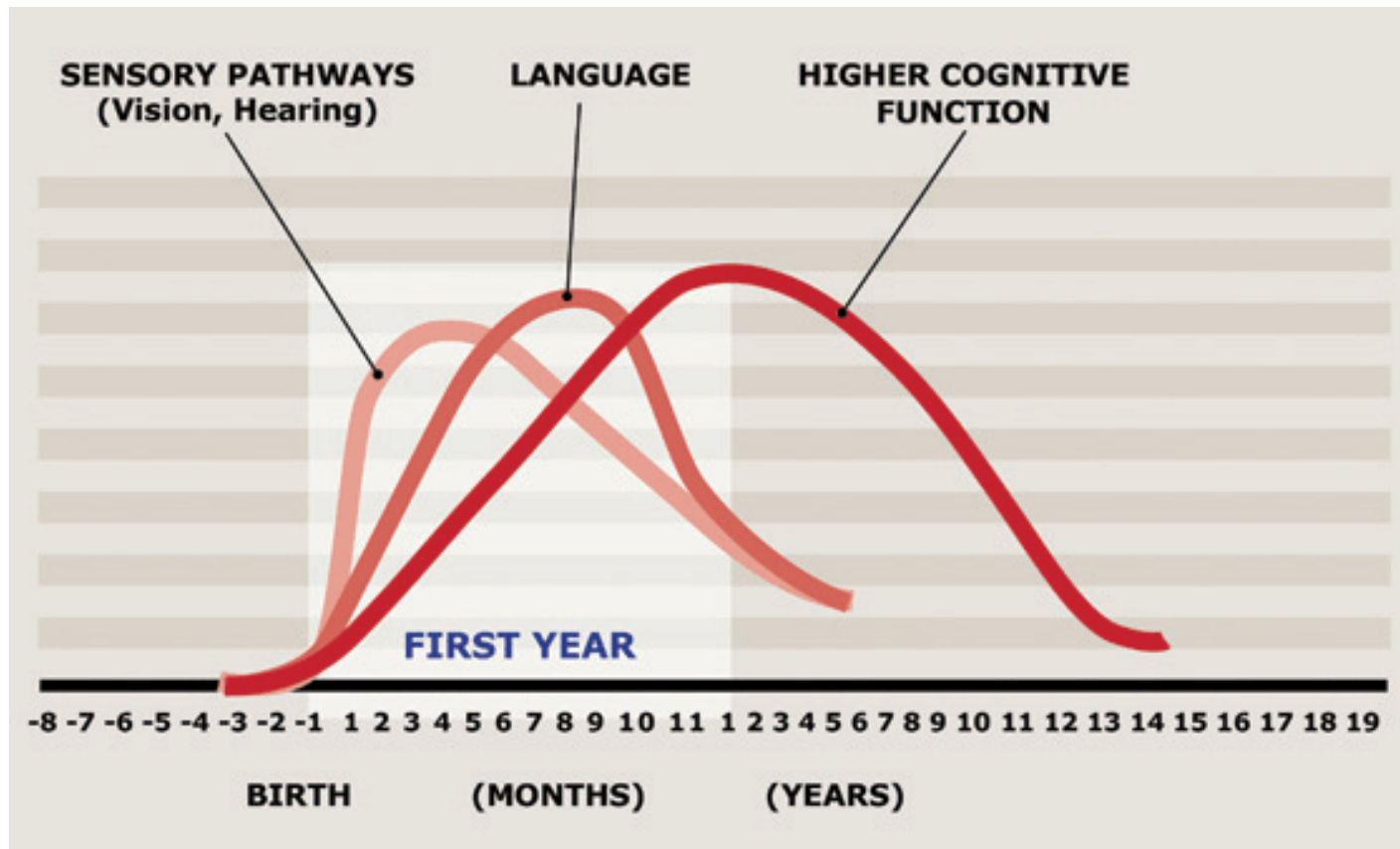
14 years old



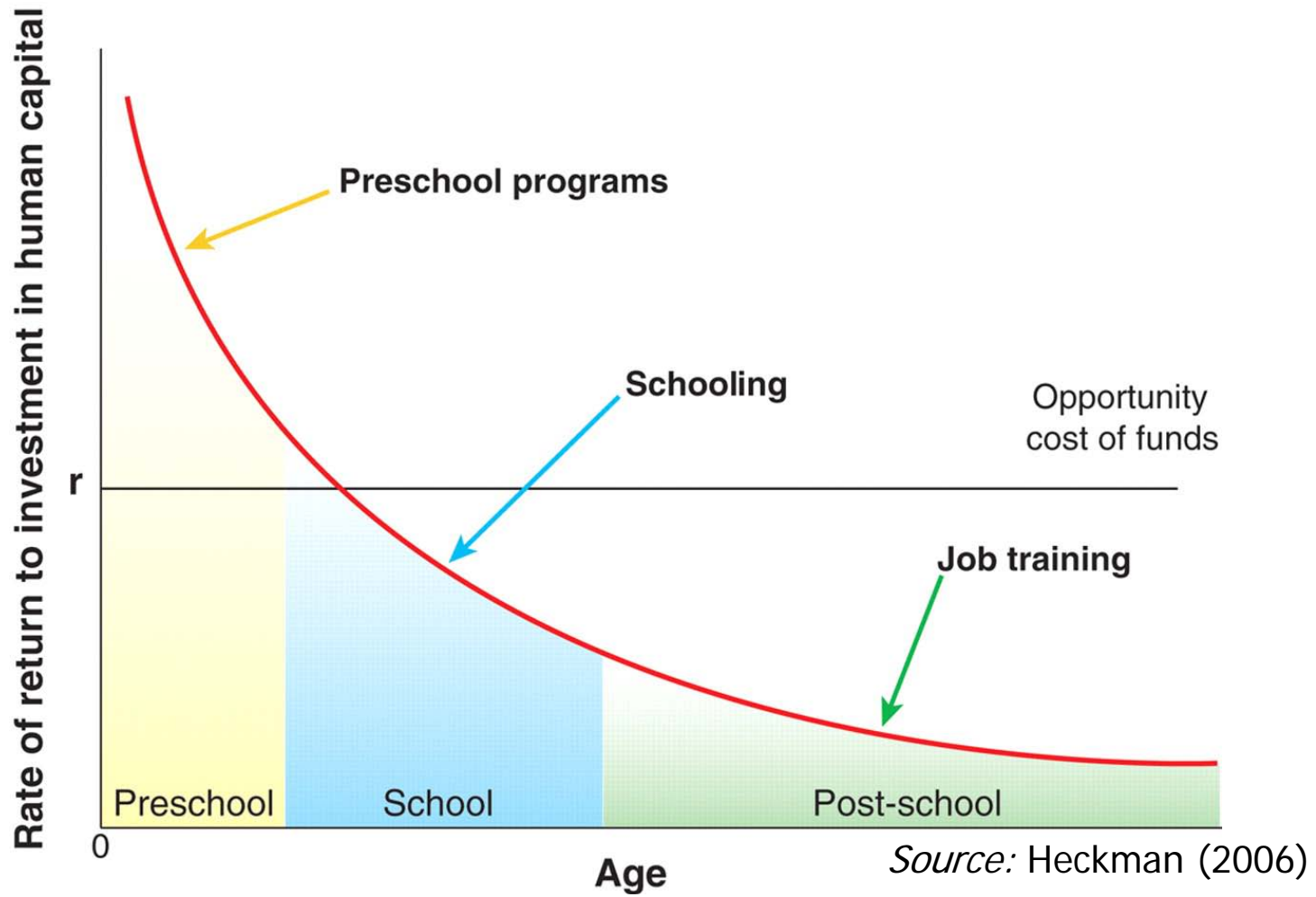
Source: Rethinking the Brain, Families and Work Institute, Rima Shore, 1997; Founders Network slide



Brains Are Built From the Bottom Up: Skills Beget Skills

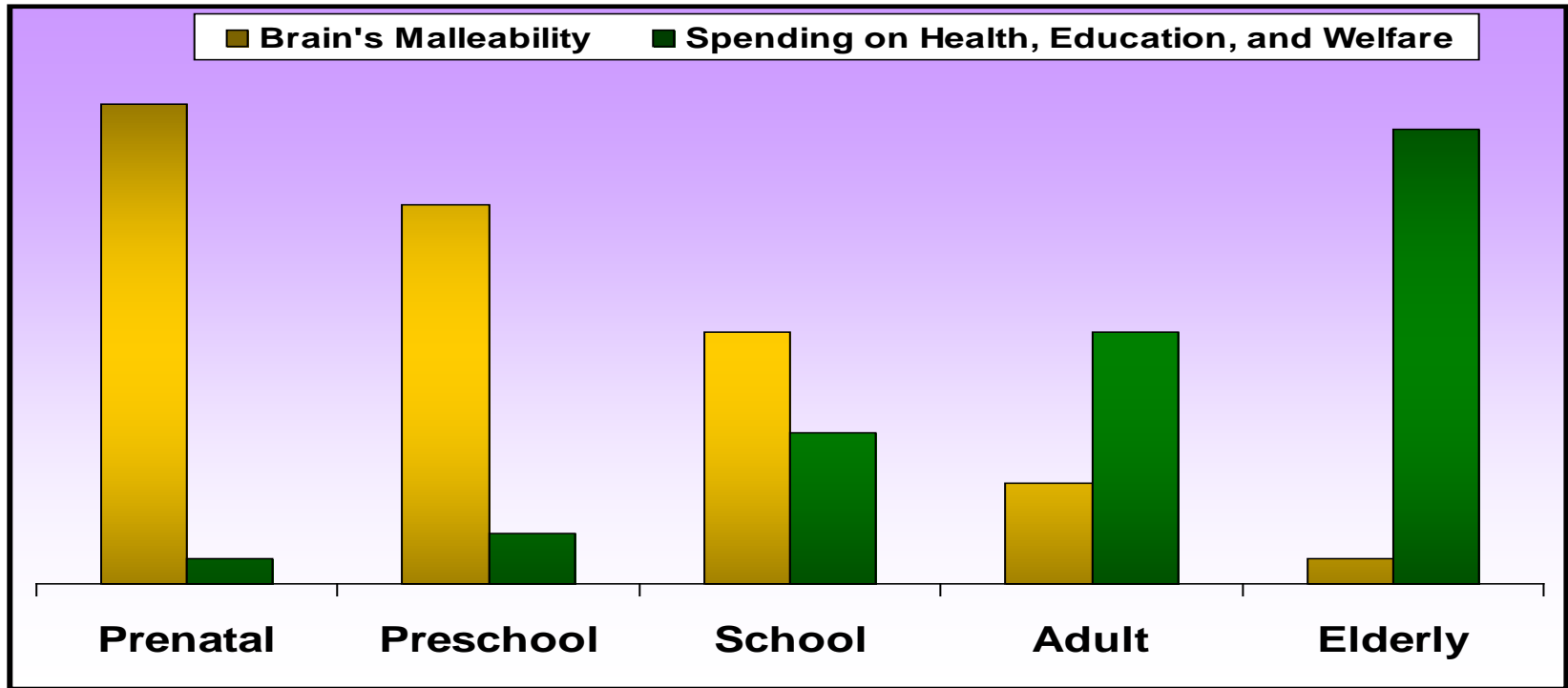


Rates of return to human capital investment



Opportunity Lost . . .

Addressing the Mismatch Between Opportunity & Investment

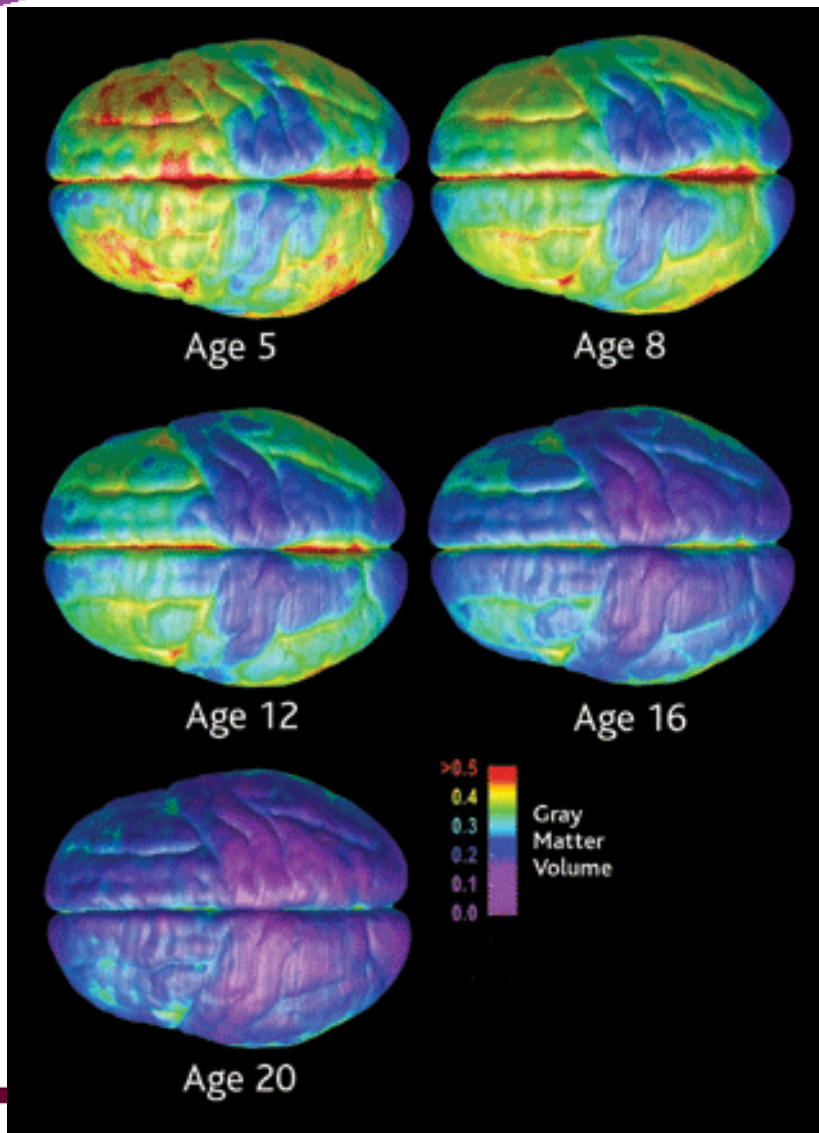


Adapted from: "How Nurture Becomes Nature: The Influence of Social Structures on Brain Development"
Bruce Perry, Baylor College of Medicine, Houston, Texas.

The Maturing Brain

- Over the first two decades, gray matter is replaced throughout the cortex, starting at the rear
- New evidence shows that this "remodelling" continues through 3rd decade of life

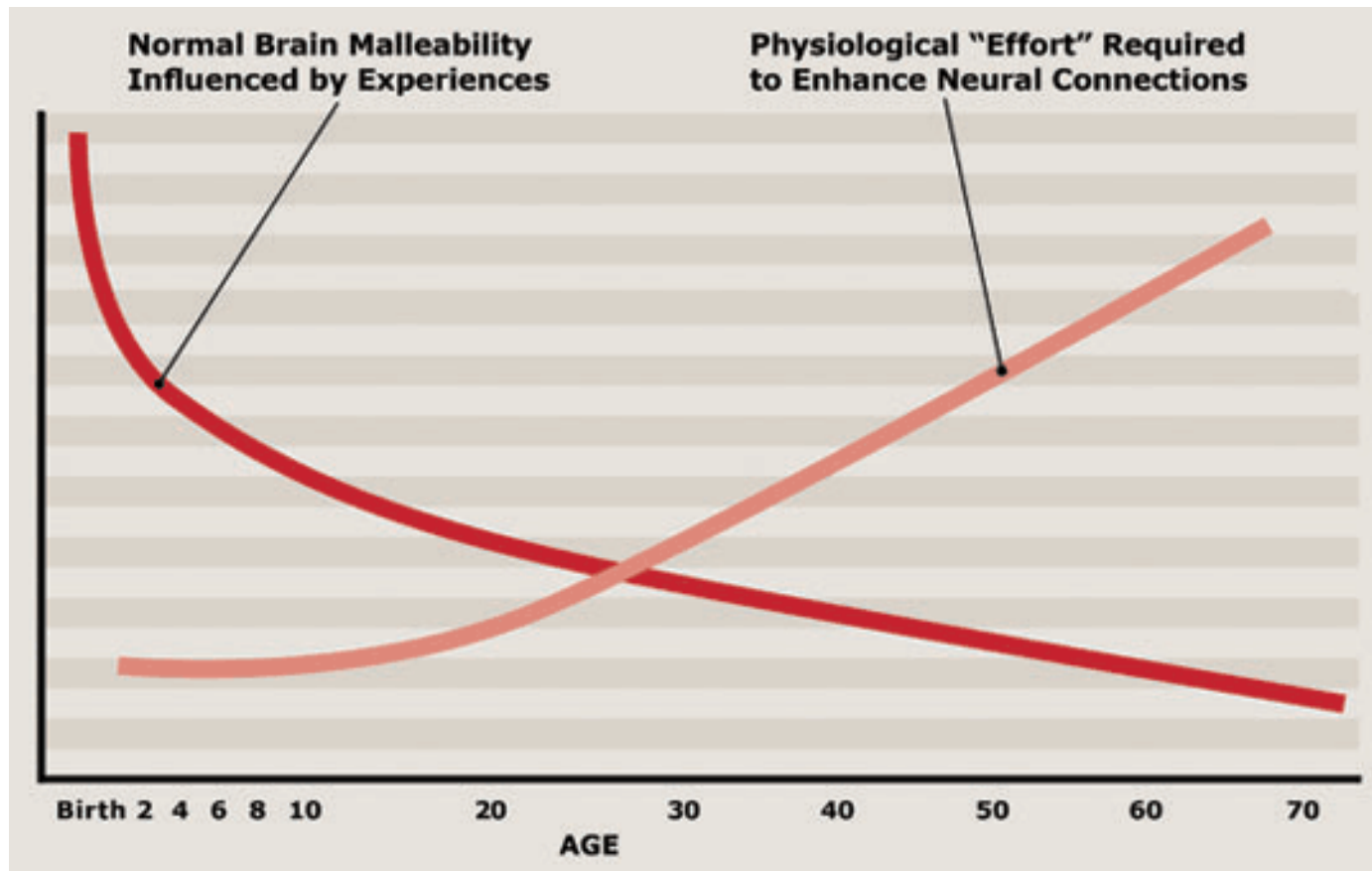
Sources: Beckman (2004), Petanjek et al. (2011)



PNAS



The Ability to Change Brains and Behaviour Decreases Over Time



Three Core Concepts in ECD:

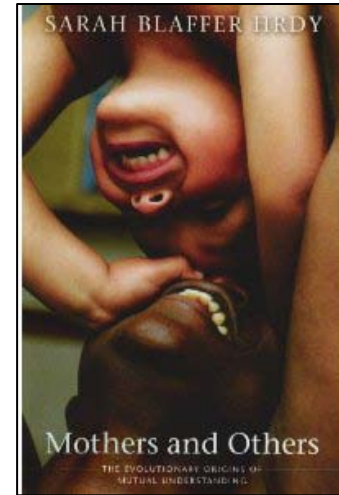
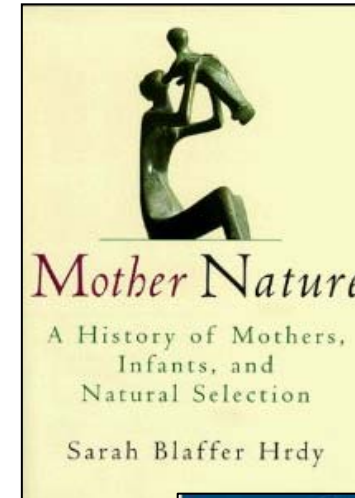
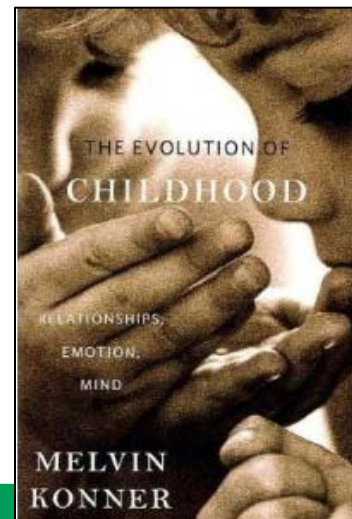
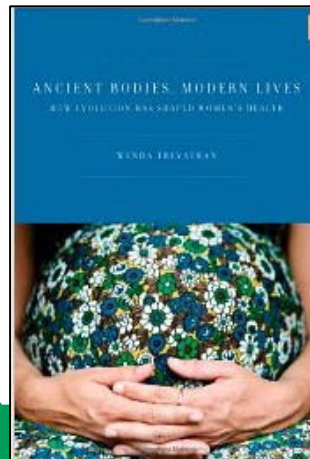
2. Serve and Return Interaction Shapes Brain Circuitry video (1:42)



http://www.youtube.com/watch?v=m_5u8-QSh6A&list=UUhBjCaJyswxSEqz26TZrWRw&index=4&feature=plcp

Mismatch: Ancient Bodies, Modern Lives

- Origins, ancestral history, evolution
- Environment of evolutionary adaptedness (EEA)
- Breastfeeding, co-sleeping, alloparenting, extended family, intergenerational peers, play, land, nature, oral history, language, culture



How Early Experiences Alter Gene Expression and Shape Development

① **EXTERNAL EXPERIENCES**
(e.g., stress, nutrition, toxins)
spark signals between neurons

② **NEURAL SIGNALS** launch
production of gene regulatory
proteins inside cell

③ **GENE REGULATORY PROTEINS**
attract or repel enzymes that
add or remove epigenetic markers

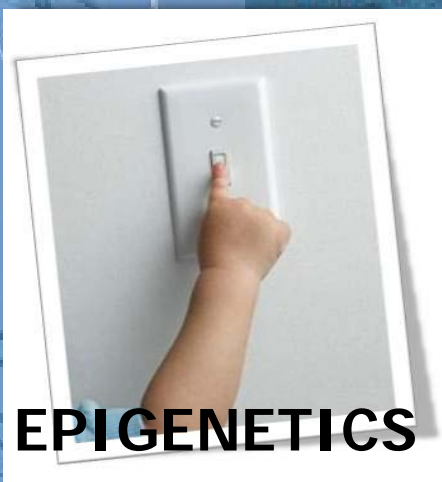
④ **EPIGENETIC "MARKERS"** control
where and how much protein is made
by a gene, effectively turning a gene
"on" or "off," thereby shaping how
brains and bodies develop

GENE – a specific
segment of a
DNA strand

DNA strands encircle histones that determine
whether or not the gene is "readable" by the cell

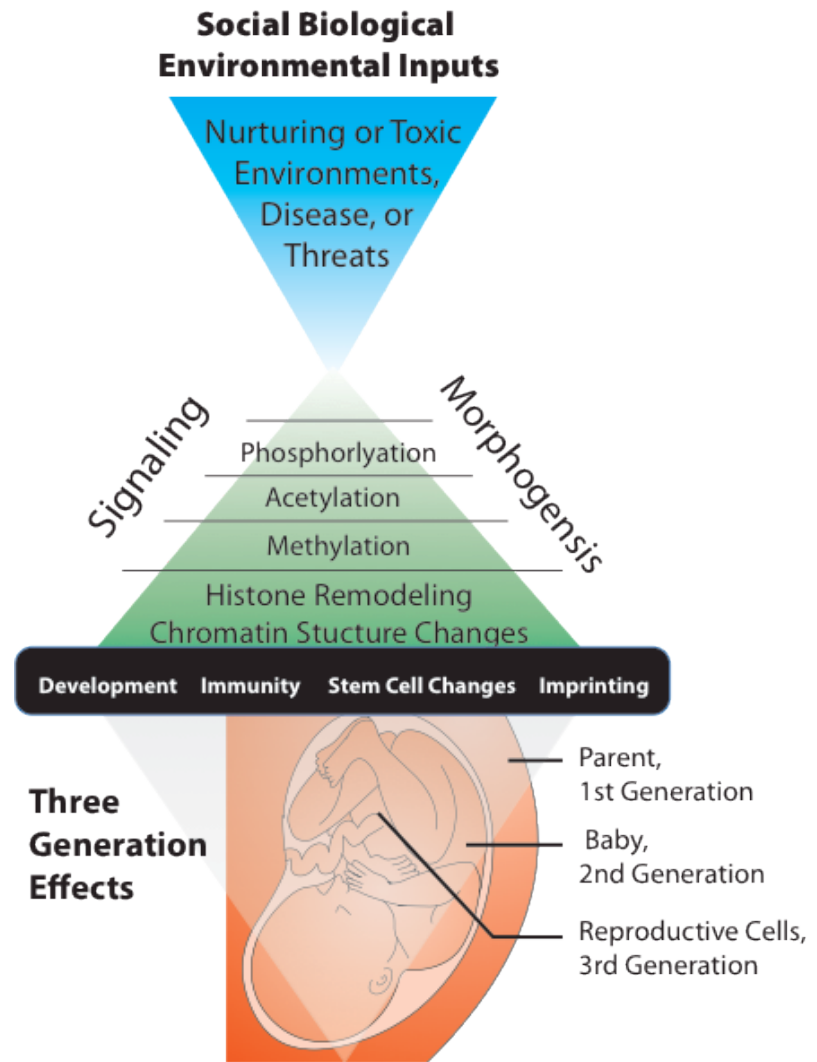
CHROMOSOME – can pass
on genes to next generation

NEURON (brain cell)

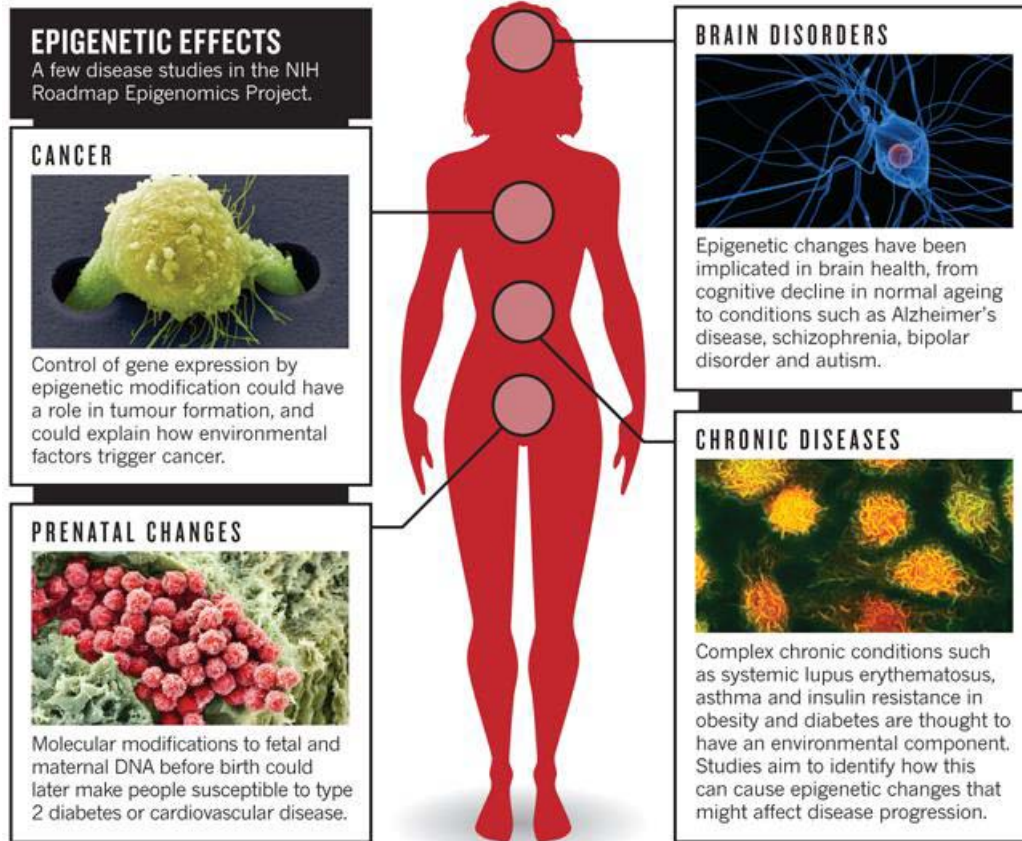


Epigenetics

- Changes in gene expression caused by mechanisms other than changes in underlying DNA sequence
- These changes can affect the present generation and may affect multiple generations



Epigenetics of Physical and Mental Health



Three Core Concepts in ECD:

3. Toxic Stress Derails Healthy Development video (1:51)

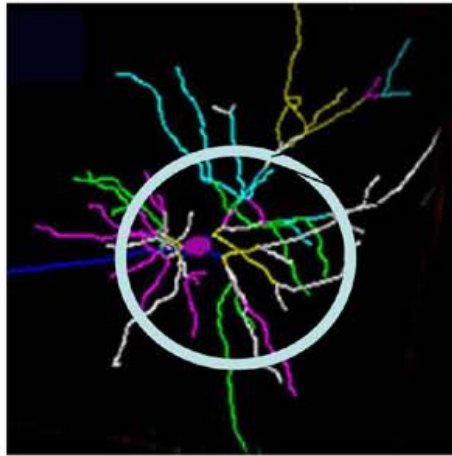


<http://www.youtube.com/watch?v=rVwFkcOZHJw&list=UUhBjCaJyswxSEqz26TZrWRw&index=3&feature=plcp>



Persistent Stress Changes Brain Architecture

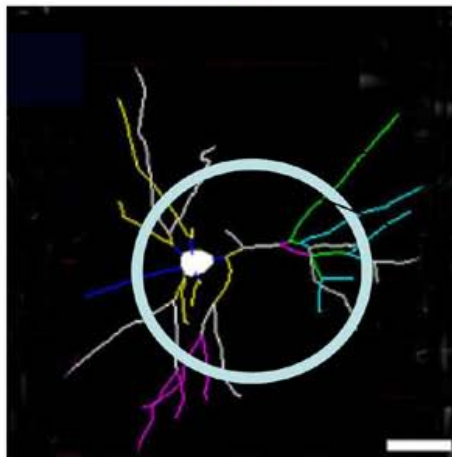
Normal



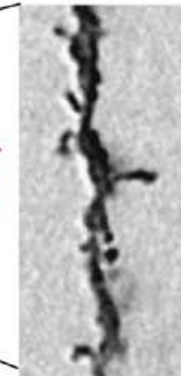
Typical neuron—
many connections



Toxic
stress



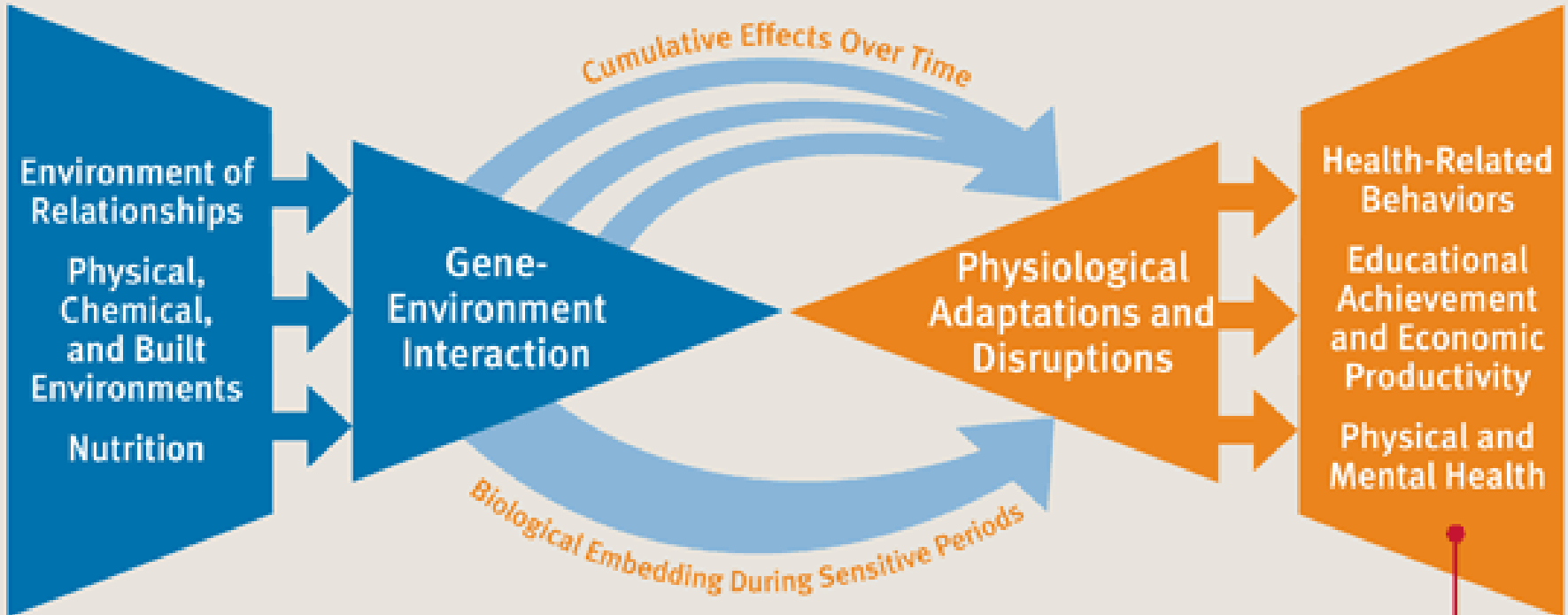
Damaged neuron—
fewer connections



Prefrontal Cortex and
Hippocampus

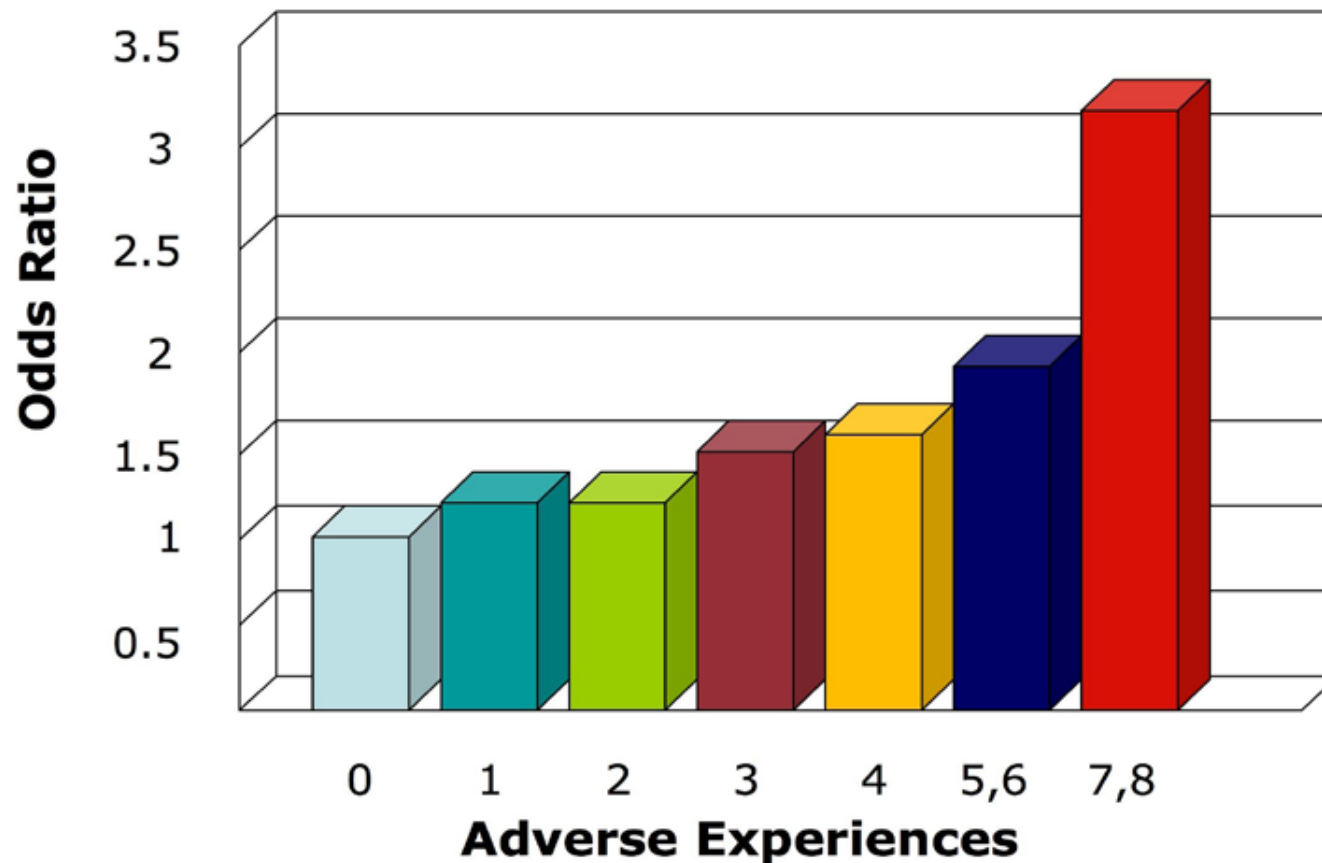
Foundations of Healthy Development and Sources of Early Adversity

Lifelong Outcomes





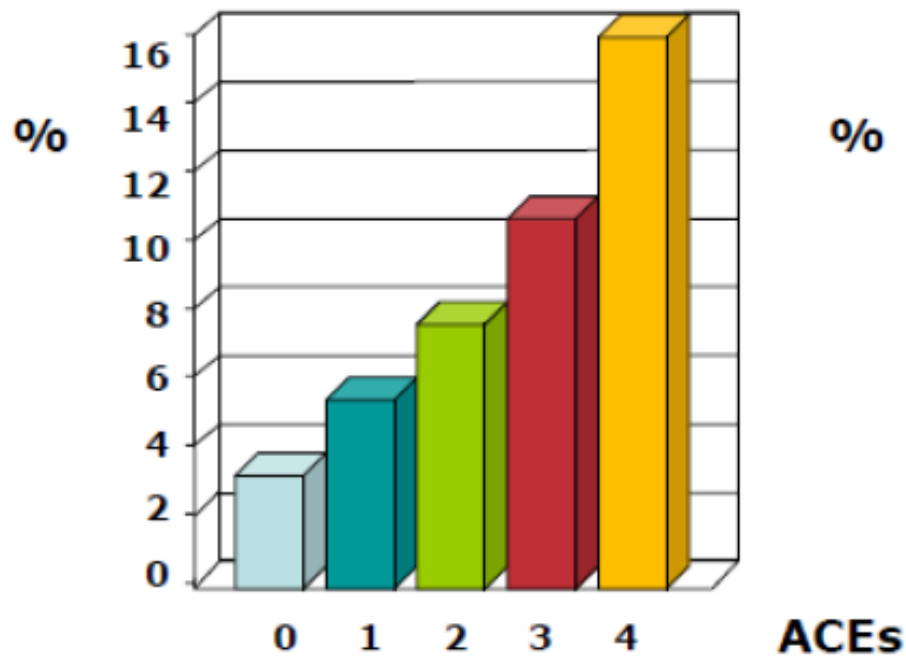
Risk Factors for Adult Heart Disease are Embedded in Adverse Childhood Experiences





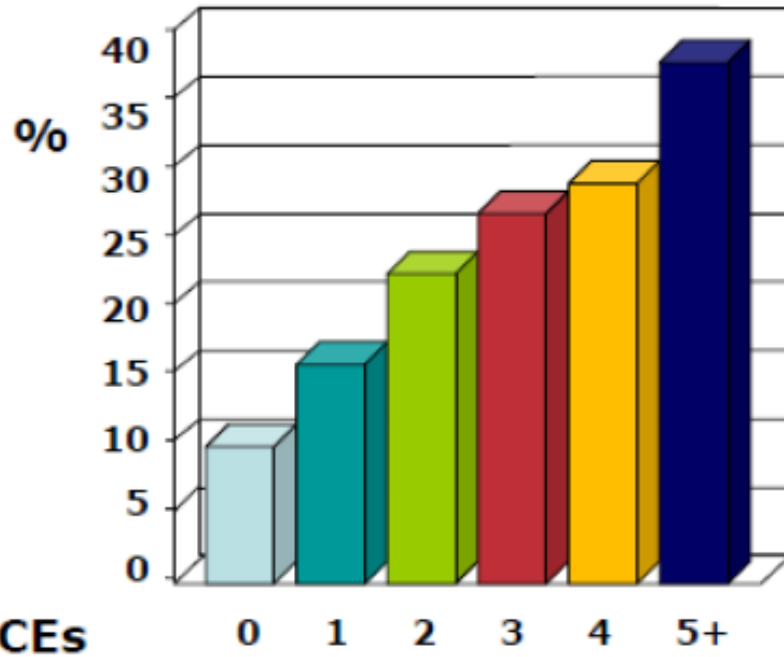
Risk Factors for Adult Substance Abuse are Embedded in Adverse Childhood Experiences

Self-Report: Alcoholism



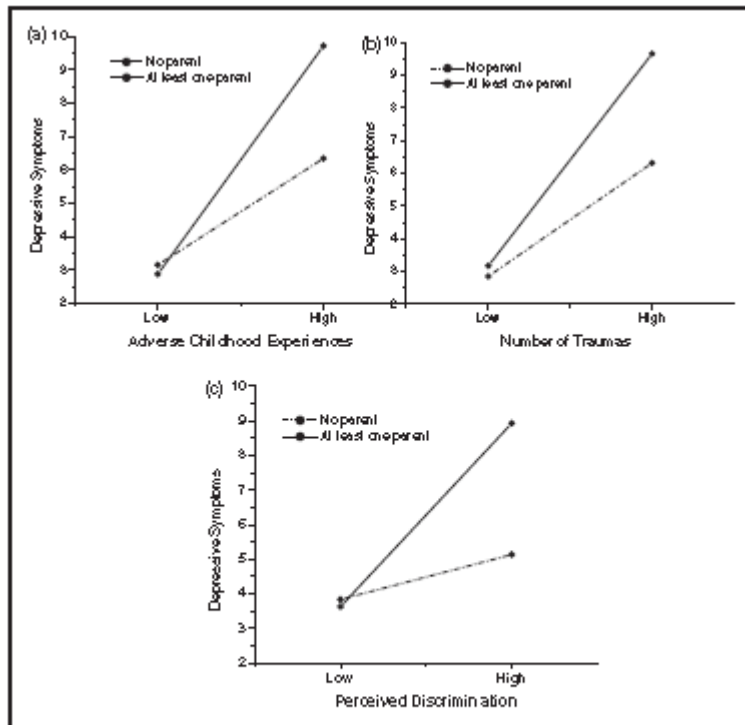
Source: Dube et al, 2002

Self-Report: Illicit Drugs



Source: Dube et al, 2005

Adverse Childhood Experiences (ACEs), Parental Indian Residential School (IRS) Attendance, and Adult Depression (Bombay et al., 2011)



- Parental IRS attendance moderated relation between stressors (ACEs, adult traumas, perceived discrimination) and adult depression
- Parental IRS attendance - ↑stress reactivity in children (2nd generation)
- Children of IRS survivors - ↑ACEs, ↑adult traumas, ↑discrimination = uniquely mediated parental IRS attendance and adult depression

Figure 1. The relations between a) adverse childhood experiences and depressive symptoms, b) number of adult traumas and depressive symptoms, and c) perceived discrimination and depressive symptoms as a function of parental IRS attendance.

Shared Destiny:

Our Aboriginal Children and the Future of Manitoba



*"Manitoba
cannot
prosper if
Aboriginal people
do not prosper."*

*-Honourable Oscar Lathlin,
Minister of Aboriginal and
Northern Affairs
(1947-2008)*





2 out of every 3 Aboriginal babies in Manitoba born into toxic stress

(2000 each year
3 in 4 First Nations
1 in 2 Metis, Inuit)



Top 10 Toxic Stressors at Birth (2003-2009)

Non-Aboriginal: (15%)

1. **Assisted birth (14%)** ↑
2. Mom < HS (14%) ↓
3. HBW birth (13%) ↓
4. Mom smoking preg (12%) ↓
5. **Mom depression (11%)** ↑
6. *Mom alcohol preg (10%) --*
7. Financial difficulties (8%) ↓
8. Premature birth (7%) ↓
9. Lone parent (6%) ↓
10. **Social isolation (5%)** ↑

Aboriginal: (67%)

1. Financial difficulties (60%) ↓
2. Mom < HS (57%) ↓
3. Mom smoking preg (56%) ↓
4. Lone parent (40%) ↓
5. *Mom alcohol preg (30%) --*
6. **Mom teen 1st birth (27%)** ↑
7. *Mom CA history (22%) --*
8. **Mom depression (21%)** ↑
9. *Existing CFS file (20%) --*
10. HBW birth (19%) ↓

1 in 4 Kindergarteners and

(4000 not ready for school each year)

2 in 4 Aboriginal

Kindergarteners in Manitoba vulnerable



Indigenous Resilience (Kirmayer et al., 2011)

- Aboriginal Peoples in Canada have diverse notions of resilience grounded in culturally distinctive concepts of the person that connect people to community + environment, collective history, Aboriginal languages + traditions, and individual + collective agency/activism
- Historical identity/continuity, revitalization of culture/language/tradition can help repair ruptures of cultural continuity that have occurred with colonization and the active suppression of indigenous cultures and identity (truth and reconciliation, culture and healing)



In Review

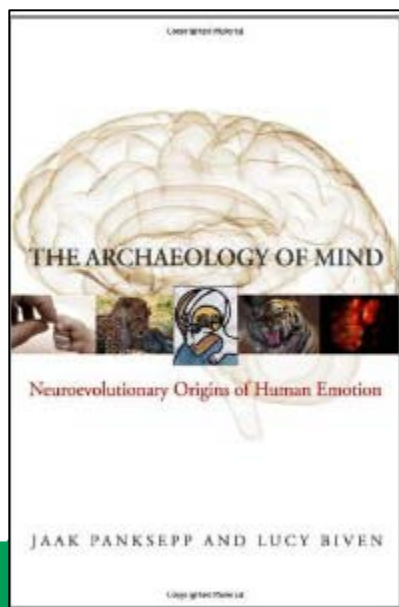
Rethinking Resilience From Indigenous Perspectives

Laurence J Kirmayer, MD¹; Stéphane Dandeneau, PhD¹; Elizabeth Marshall, BA²;
Morgan Kahenionni Phillips, MA³; Karla Jessen Williamson, PhD⁴

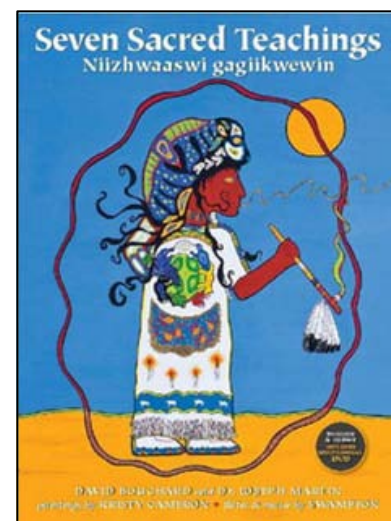


Seven Emotional Systems (Panksepp & Biven, 2012) and The Seven Sacred Teachings

- Seven evolutionary tools for living: SEEKING, ANGER, FEAR, LUST, CARE, PANIC, PLAY
- Seven teachings shared by many Indigenous peoples: LOVE, RESPECT, COURAGE, HONESTY, WISDOM, HUMILITY, TRUTH



(from Turtle Lodge - Sagkeeng First Nation)



Conclusions and a Call to Action

- **Our children are the foundation for a prosperous and sustainable Manitoba** (child development = base for community development and economic development)
- **Early experiences build brain architecture** (for better or worse)
- Skill begets skill: brains are built “from the bottom up” from before birth through to adulthood
- **Serve and return:** genes and environment (of relationships) shape the developing brain
- Can't do one without the other: cognitive, social, emotional capacities all intertwined
- **Toxic stress damages the developing brain** ... leading to later learning, behaviour, physical and mental health problems
- **Invest early (pay now or pay later):** getting it right early is less costly to each of us and all of us, than trying to fix it later
- **Simple changes can make big differences** – promotion and prevention for all of us (“everyone, every place, every day”), spread like dandelion seeds
- **Put the best knowledge into action at a population level** ... be a brain hero!
- **Manitoba innovation and ingenuity: Together we can: give all of our children a fair start, their fair share, and the life chances that are their birthright**



Thank You

Dr. Rob Santos
Associate Secretary to
Healthy Child Committee of Cabinet
Executive Director, Science and Policy
Healthy Child Manitoba Office
Government of Manitoba

Research Scientist
Manitoba Centre for Health Policy
Assistant Professor
Department of Community Health Sciences
Faculty of Medicine
University of Manitoba

Rob.Santos@gov.mb.ca
www.gov.mb.ca/healthychild
www.umanitoba.ca



