

DR J. FRASER MUSTARD

ADELAIDE THINKER IN RESIDENCE

Early Childhood Development and its Contribution to Economic Development



Adelaide 16 November 2006

Committee for Economic Development of Australia

Adelaide, South Australia

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By J. Fraser Mustard Founding President, CIAR Adelaide Thinker in Residence

November 16, 2006



Robert W. Fogel. "Economic Growth, Population Theory, and Physiology, April 1994

The Economist

The Search for Talent

Why It's Getting Harder to Find

The Economist, October 7, 2006

Talent Clusters

- Technology hubs
- Idyllic settings
- Quality university cities
- Family supporting communities

What do we know?

Experience-Based Brain Development in the early years of life sets neurological and biological pathways that affect throughout life:

Health
Learning
Behaviour

Two Neurons



Experience and Brain Development

- Stimuli in early life switch on genetic pathways that differentiate neuron function – critical and sensitive periods.
- Stimuli affect the formation of the connections (synapses) among the billions of neurons (sensitive periods).
- The brain pathways that affect literacy, behaviour, and health form early.
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Synaptic Density

At Birth 6 Years Old 14 Years Old

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Limbic HPA Pathway - Stress

Cortisol – Over Production

Behaviour, depression, type II diabetes, malnutrition, cardiovascular disease, memory, immune system, drug and alcohol addiction

Cortisol – Under Production

Chronic fatigue syndrome, fibromyalgia, immune system (autoimmune disorders) rheumatoid arthritis, allergies, asthma

The Myth of the Bell Curve Genetics

Nature versus nurture Genotype Phenotype - Epigenetics

Epigenetics and Brain Plasticity

- Experience and methylation of DNA
- Imprints environmental experiences on the fixed genome
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Epigenetics

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Behaviour

"The aftermath ... [of poor early child development] can appear as depression, anxiety, suicidal thoughts or posttraumatic stress – or as aggression, impulsiveness, delinquency, hyperactivity or substance abuse."

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Early Child Development and Language

Starts early – first 12 months

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Document Literacy 1994 – 1998, Ages 16 to 65

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Intervene early

Intervene often

Intervene effectively

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Percentage of Children in Kindergarten Scoring in Bottom 10% by District - Vancouver



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Cooper Pedy Leigh Creek Port Augusta Roxby Downs Whyalla

29.4 42.1 43.1 15.6 27.4

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Heckman - Education

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