Council for Early Child Development

Putting Science into Action

Sackville, NB

A Call to Action

By J. Fraser Mustard
The Founders' Network
Founding Chairman
Council for Early Child Development

May 15, 2009

History
Early Human Development

1. Population Health (1988) – Bob Evans
   ↓ Hertzman
2. Human Development (1992)– Dan Keating
   ↓ Hertzman
3. Experience-based Brain and Biological Development (2003) – Ron Barr
   ↓ Hertzman
4. Canadian Council for ECD (2004)
   Hertzman

Hypothesis: Biological Embedding

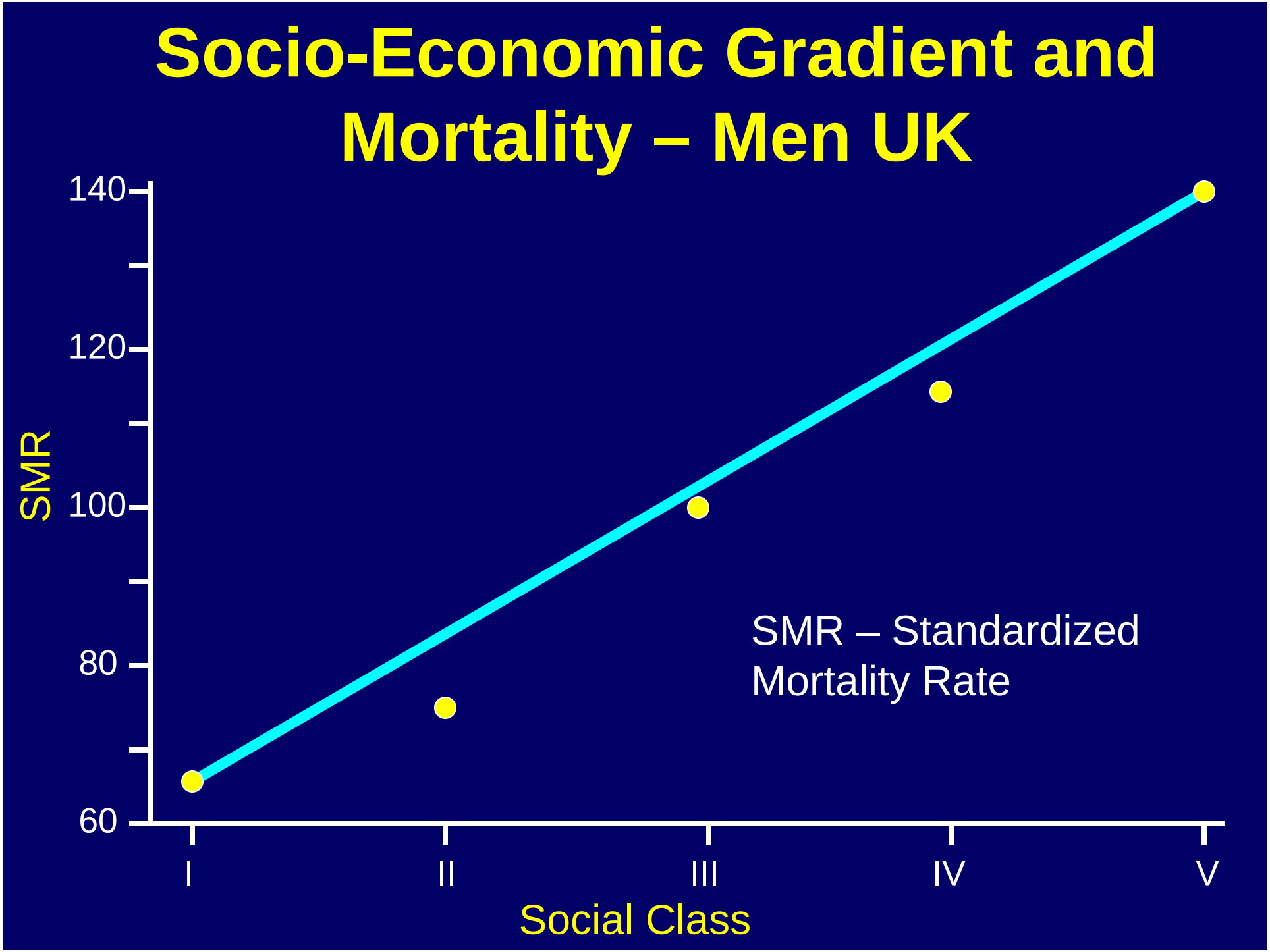
- Biological embedding occurs when:
  ↓
- Experience gets under the skin and alters human biodevelopment.
  ↓
- Systematic differences in experience in different social environments lead to different biodevelopmental states.
  ↓
- The differences are stable and long-term; they influence health, well-being, learning, and/or behaviour over the life course.

Hertzman

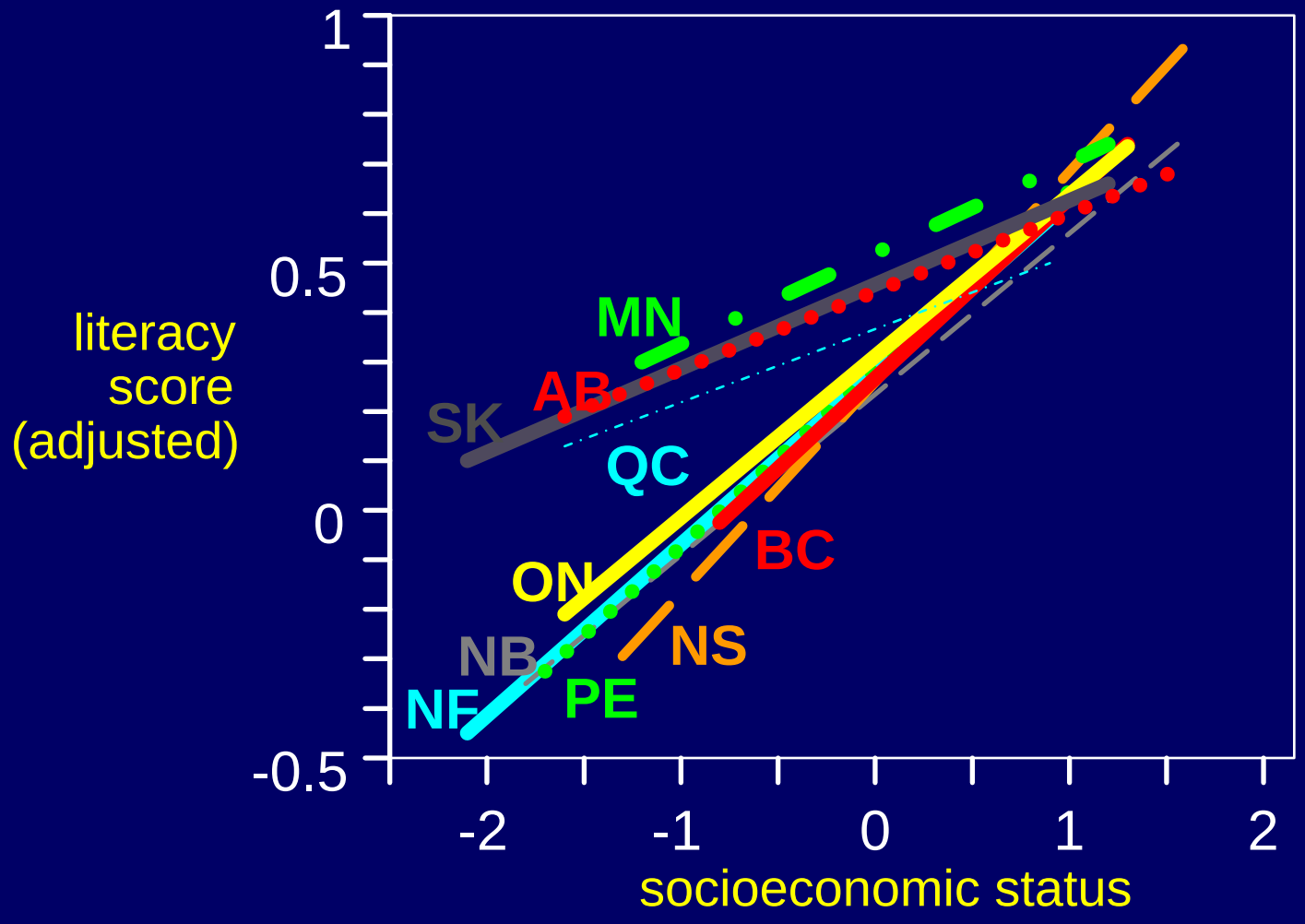
Experience-Based Brain development in the early years of life sets neurological and biological pathways that affect throughout life:

- Health
- Learning (literacy)
- Behaviour

Socio-Economic Gradient and Mortality – Men UK

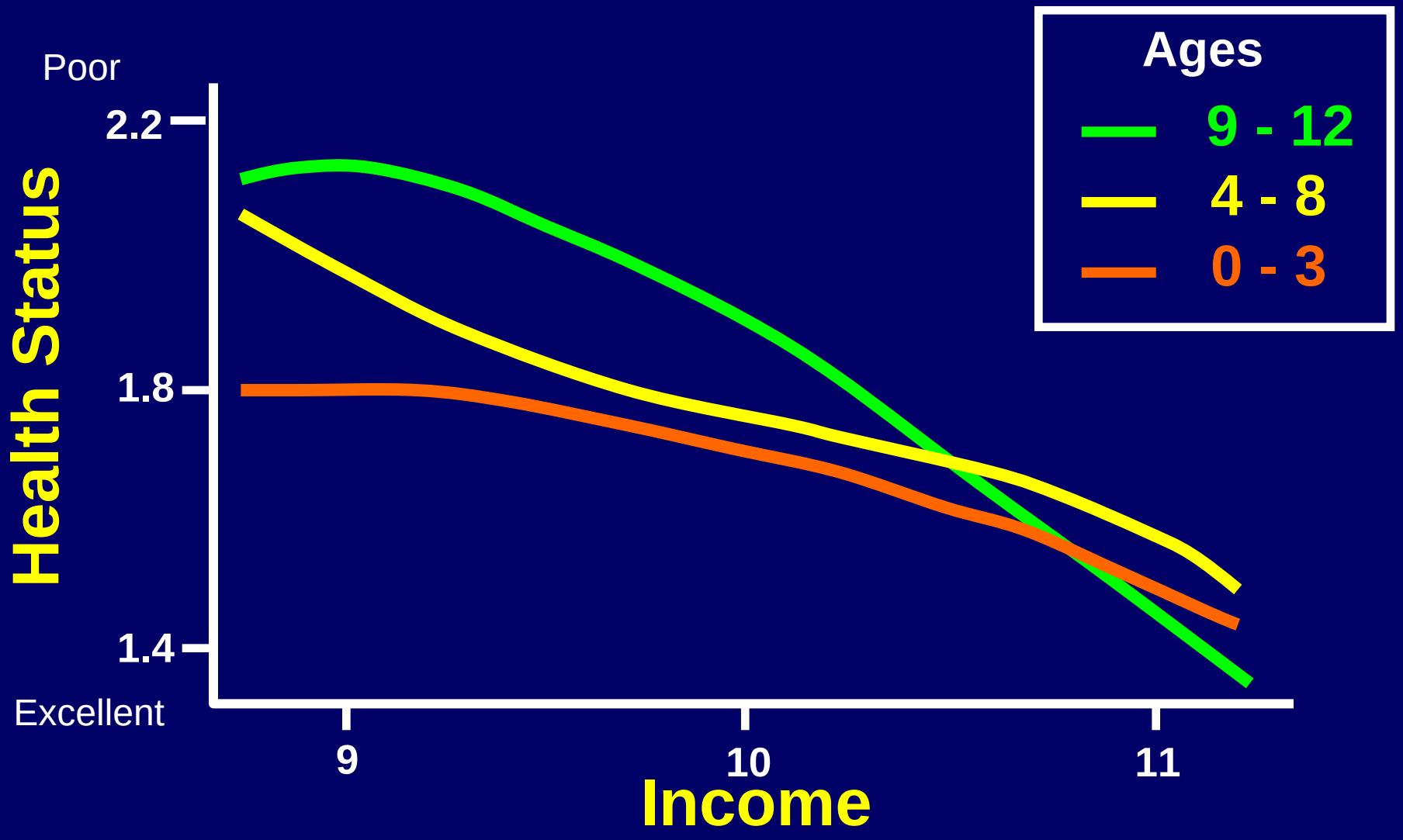


Literacy and SES Gradients for Youth by Province 1994



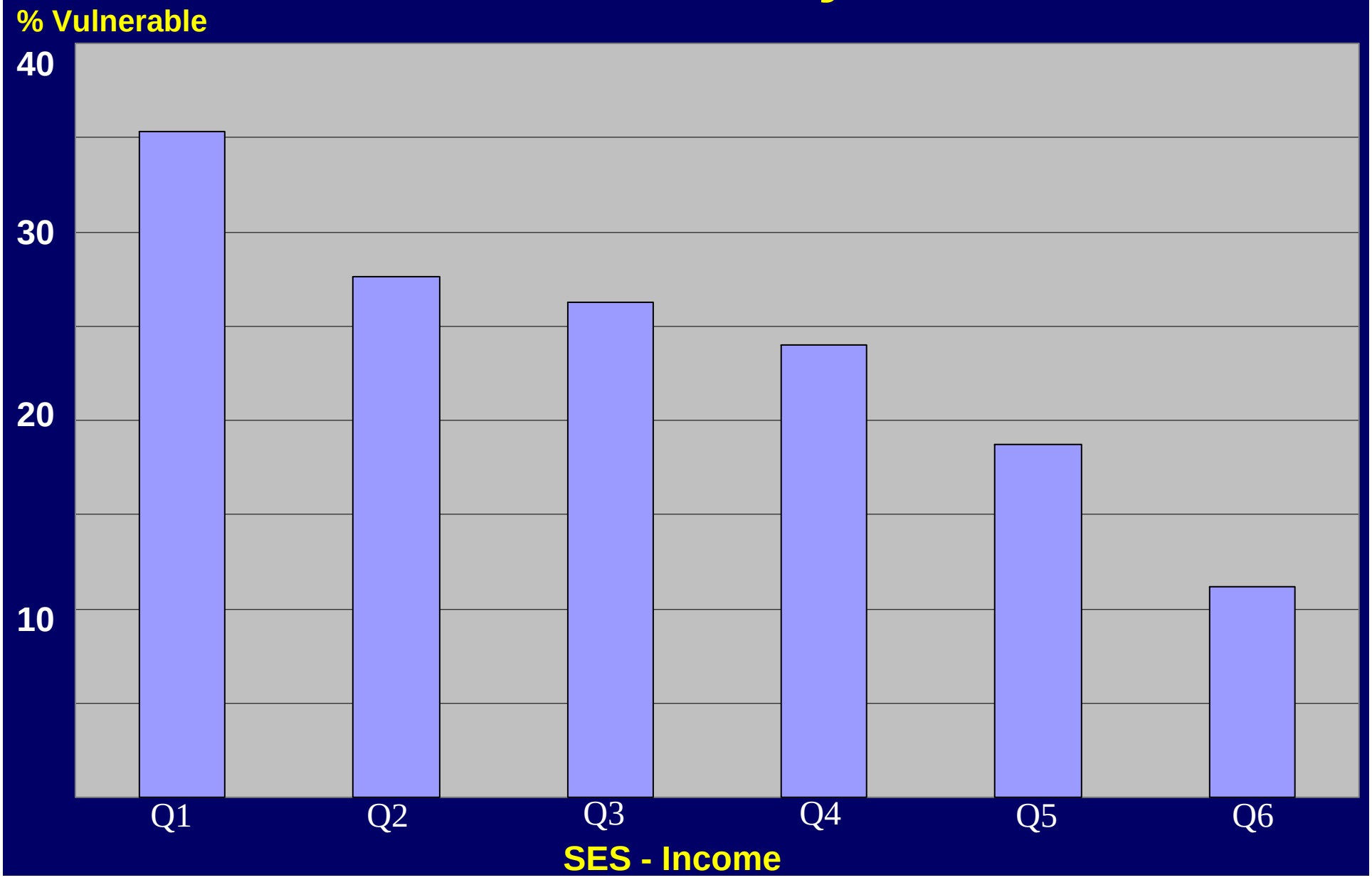
J. Douglas Willms, "Literacy Skills of Canadian Youth"
Atlantic Centre for Policy Reseach in Education, University of New Brunswick, October 21, 1996. Prepared for Statistics Canada.

Health Gradients



Panel Study of Income Dynamics. In **Case, 2002**

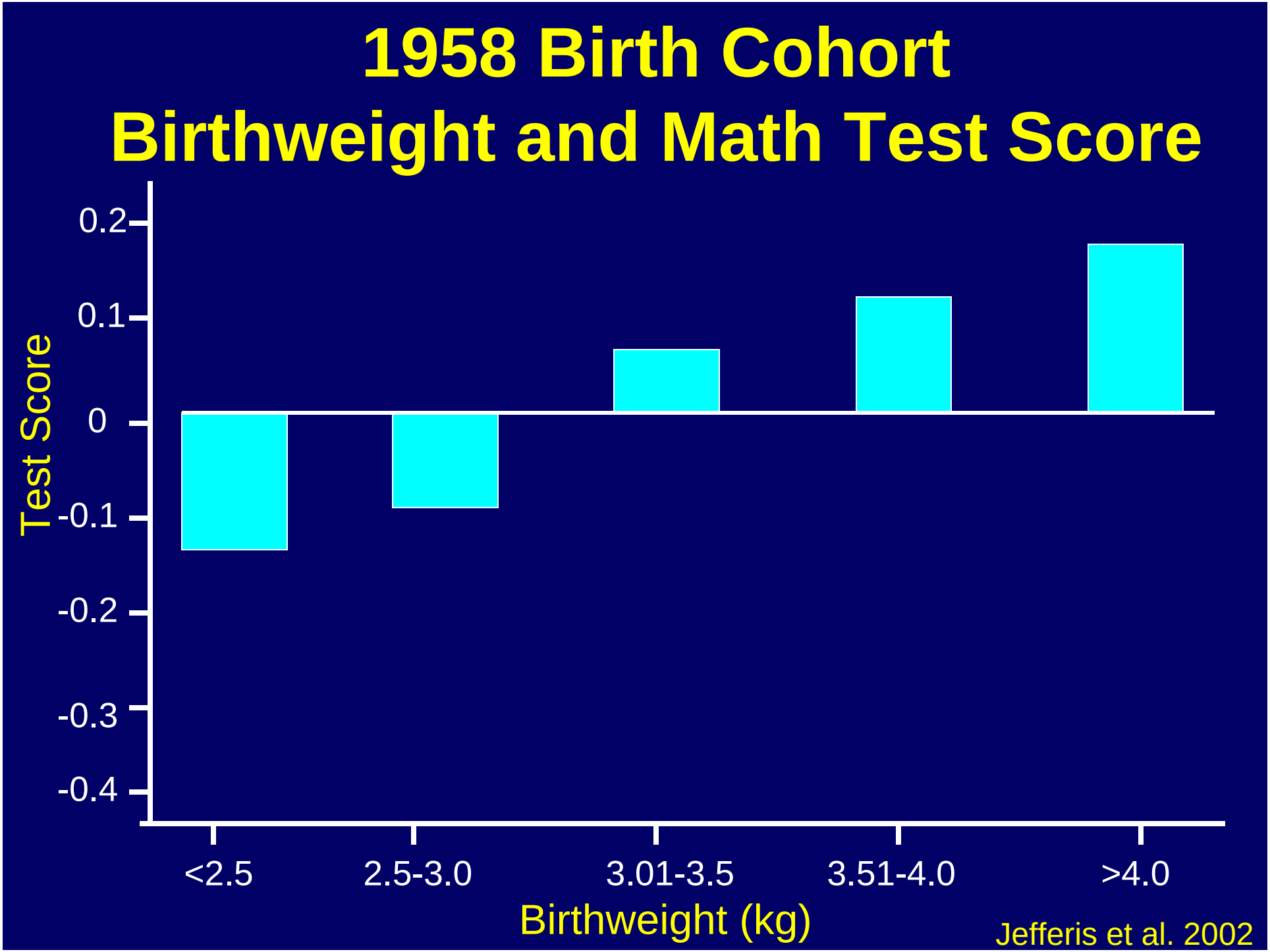
Australia – AEDI
Children 5-6 yrs.



The Challenge of the Gradient

- Ubiquitous in world countries by income, education, or occupation.
- Socioeconomic gradients in health, behaviour, and learning.
- Not easily explained by traditional risk factors.
- Possible factor – developmental neurobiology.
- Gradients in ‘developmental health’, behaviour and cognition are evident very early in life.

Hertzman


1958 Birth Cohort
Birthweight and Math Test Score
Test Score
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
<2.5
2.5-3.0
3.01-3.5
3.51-4.0
>4.0
Birthweight (kg)
Jefferis et al. 2002

The epidemiologic observations that smaller size or relative thinness at birth and during infancy is associated with increased rates of coronary heart disease, stroke, type 2 diabetes mellitus, adiposity, the metabolic syndrome, and osteoporosis in adult life have been extensively replicated.

Gluckman et al. 2008

Why do we care about brains?

You are your brain.

BUT
Your brain is not just produced by your genes.

Your brain is sculpted by a lifetime of experiences. The most important time in brain development is in utero and the first few years of life.

What is experience?

The stimuli that you encounter both pre- and postnatally as well as in adulthood…

Examples: sound, touch, vision, smell, food, thoughts, drugs, injury, disease etc.

Does Experience have the Same Effects on Brain Development at Different Times in Life?

No !

There are qualitative differences at different stages of life.

There is something fundamentally different prenatally vs infancy vs juvenile vs adult.

One difference is gene expression (genotype vs phenotype).

In individuals, all the neurons have the same DNA.

How do the neurons differentiate for their diverse functions (vision, hearing, etc.)?

Stimulation Affects Gene Function

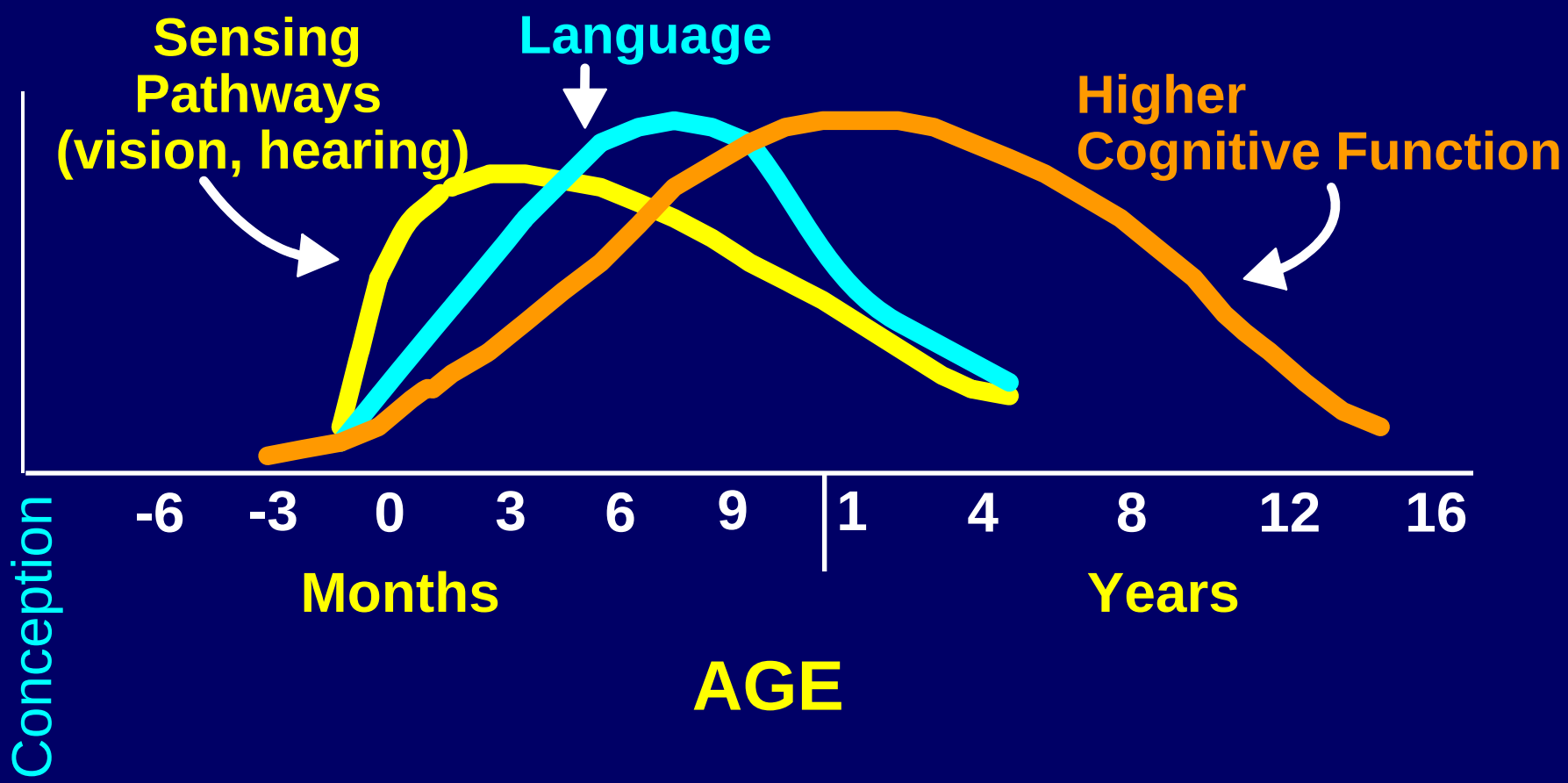
- Epigenetics - Methylation affects normal gene function
- MicroRNAs affect gene messenger RNA (mRNA) expression and function

Brain Pathways (sensitive periods)

- “Higher levels of brain circuits depend on precise, reliable information from lower levels in order to accomplish their function.
- Sensitive periods for development of lower level circuits ends early in life.
- High level circuits remain plastic for a longer period.”

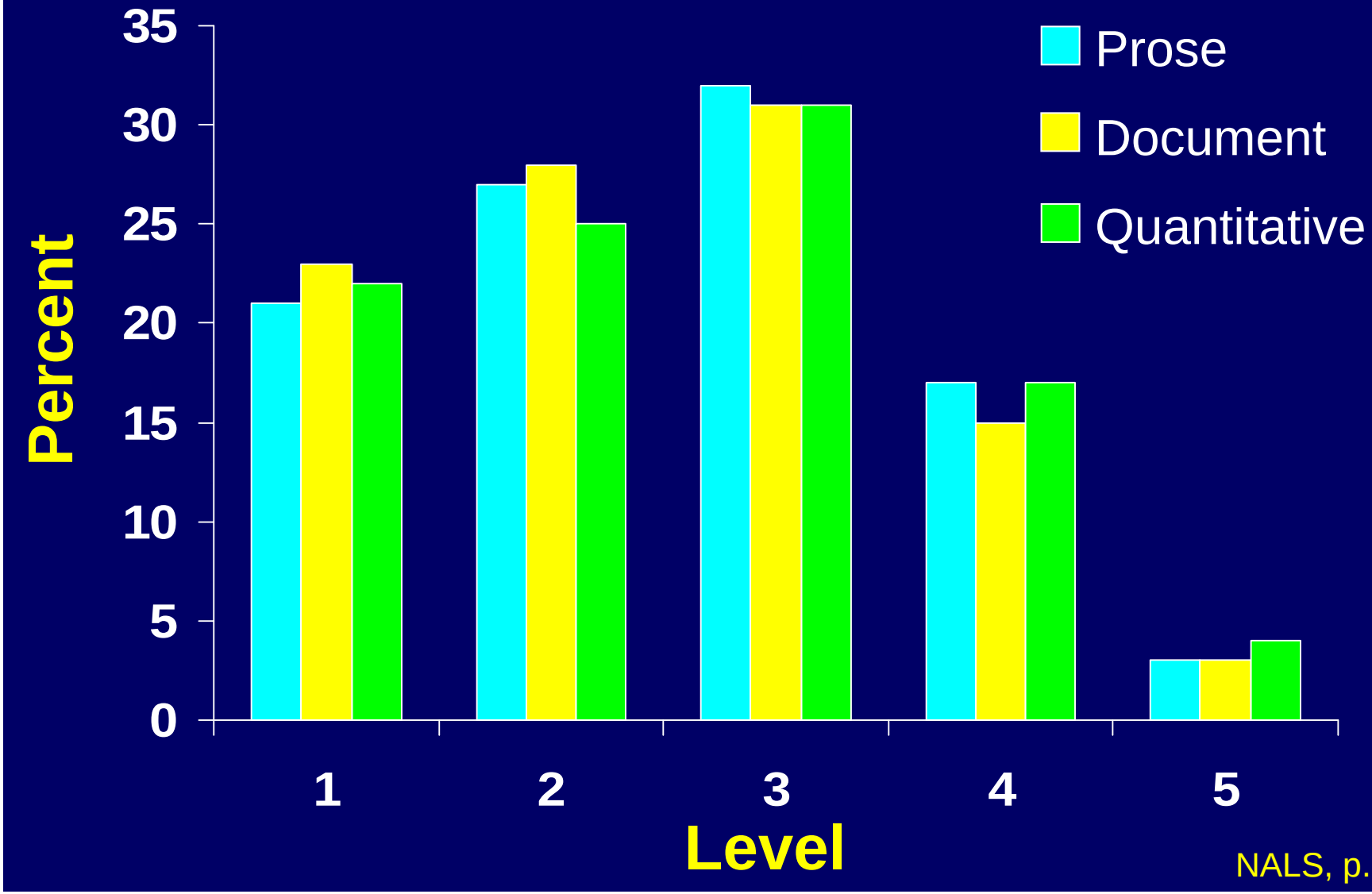
Knudsen 2004

Human Brain Development – Language and Cognition



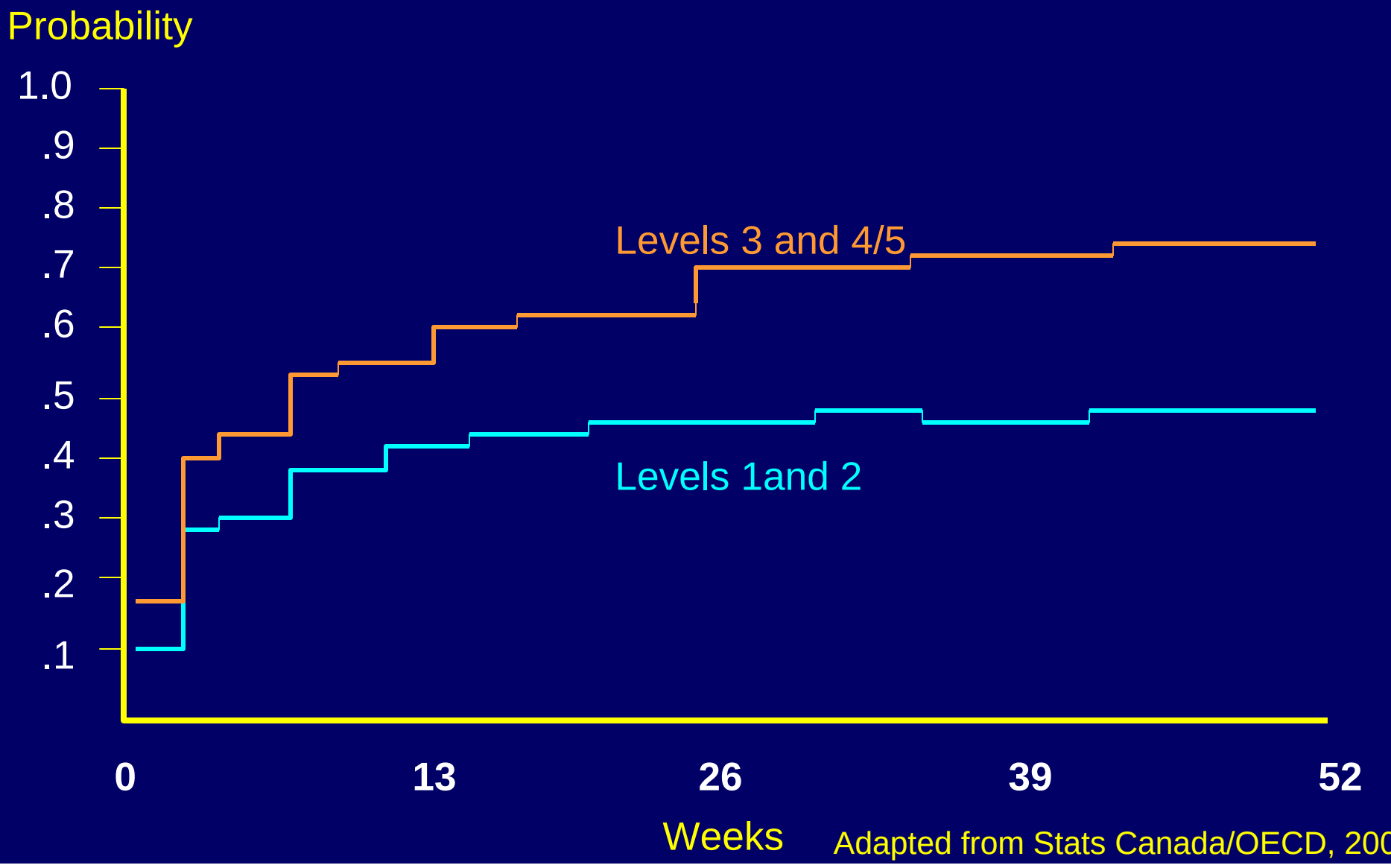
C. Nelson, in From Neurons to Neighborhoods, 2000.

Literacy Levels for the Population Ages 16 to 65 – USA



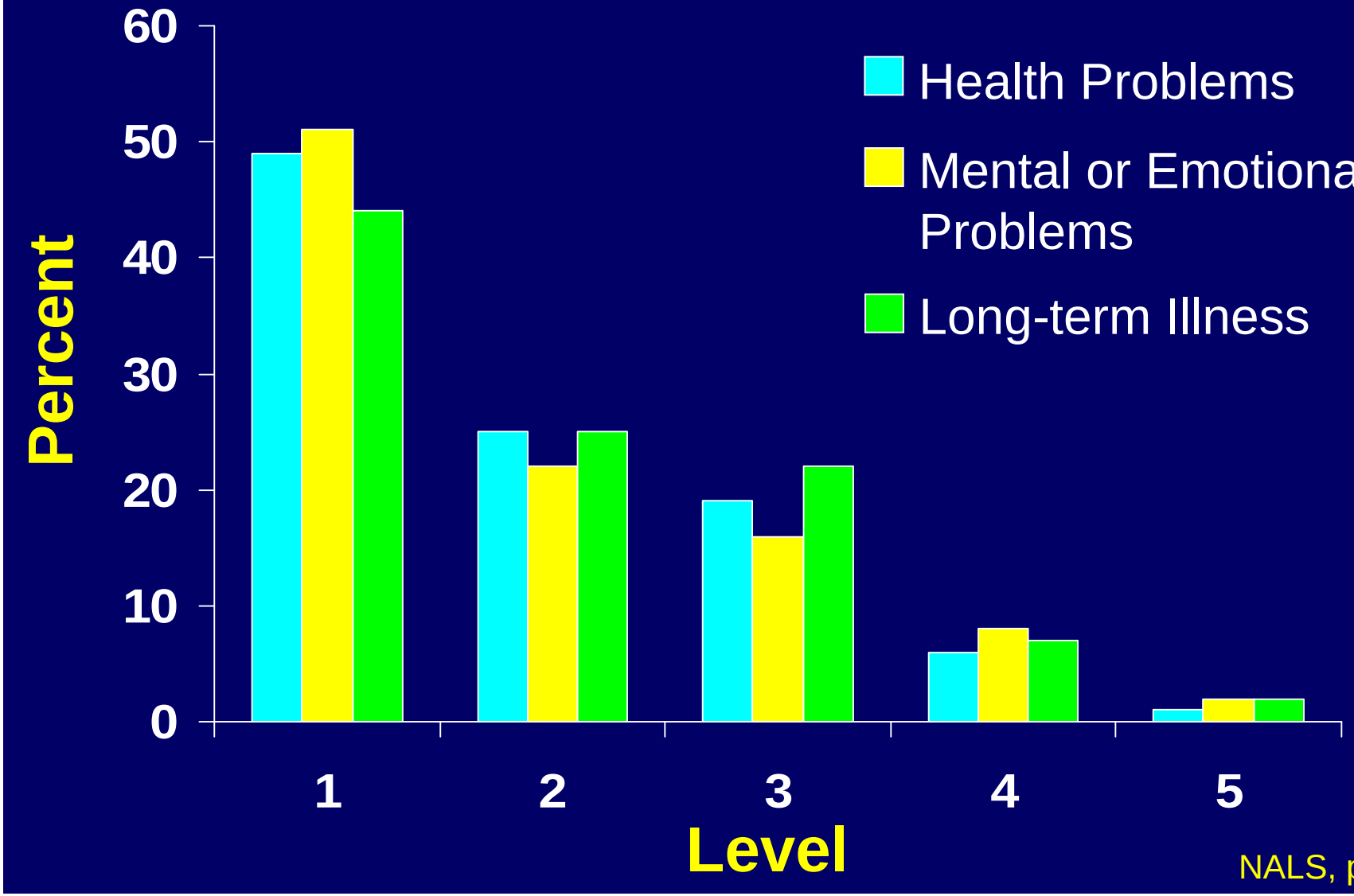
NALS, p. 17, 2002

Re-employment by Literacy Level



Adapted from Stats Canada/OECD, 2005

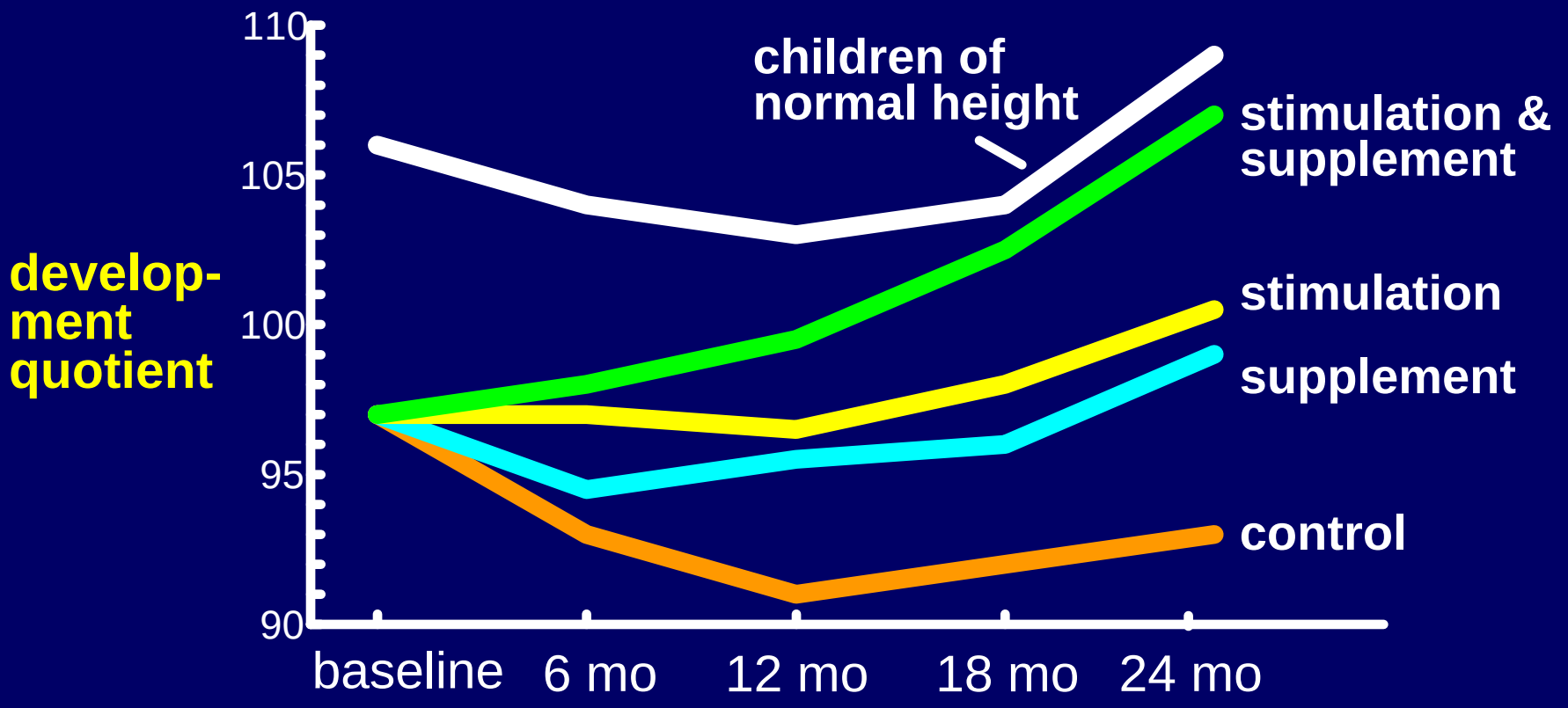
Literacy Levels (Quantitative) and Physical, Mental or Other Health Conditions – USA



NALS, p. 44, 2002

THE EVIDENCE ABOUT EARLY CHILD DEVELOPMENT PROGRAMS

Mental Development of Undersized Children (Low Height for Age) : The Jamaican Study



Grantham-McGregor 1991

A "Natural" Experiment: Romanian Orphan Adoption

Children adopted into middle class homes after 8 months in the orphanages show at 11 years in contrast to children adopted early:

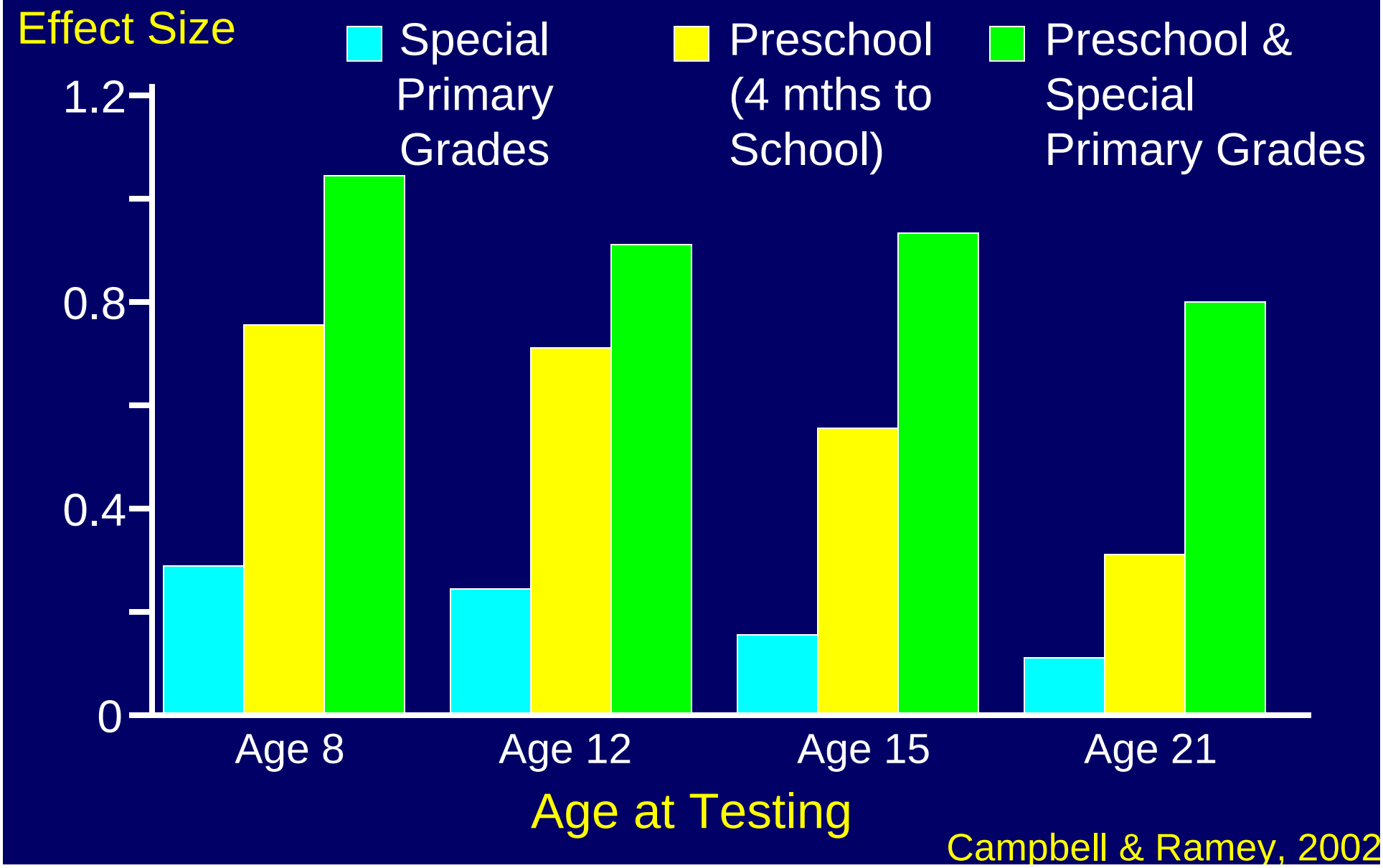
1. Abnormal brain development (small brain, low metabolic activity, abnormal EEG)
2. Social and cognitive problems (IQ loss)
3. High vulnerability to behavioural problems (ADHD, aggression, quasi-autism)

Bucharest Early Intervention Project

The children who were youngest when placed in foster care are approaching normal development, a recovery that sadly does not seem to be occurring in children first placed in foster care well after the age of 2.

C. Nelson, The Bucharest Early Intervention Project

Abecedarian Study – Reading



Campbell & Ramey, 2002

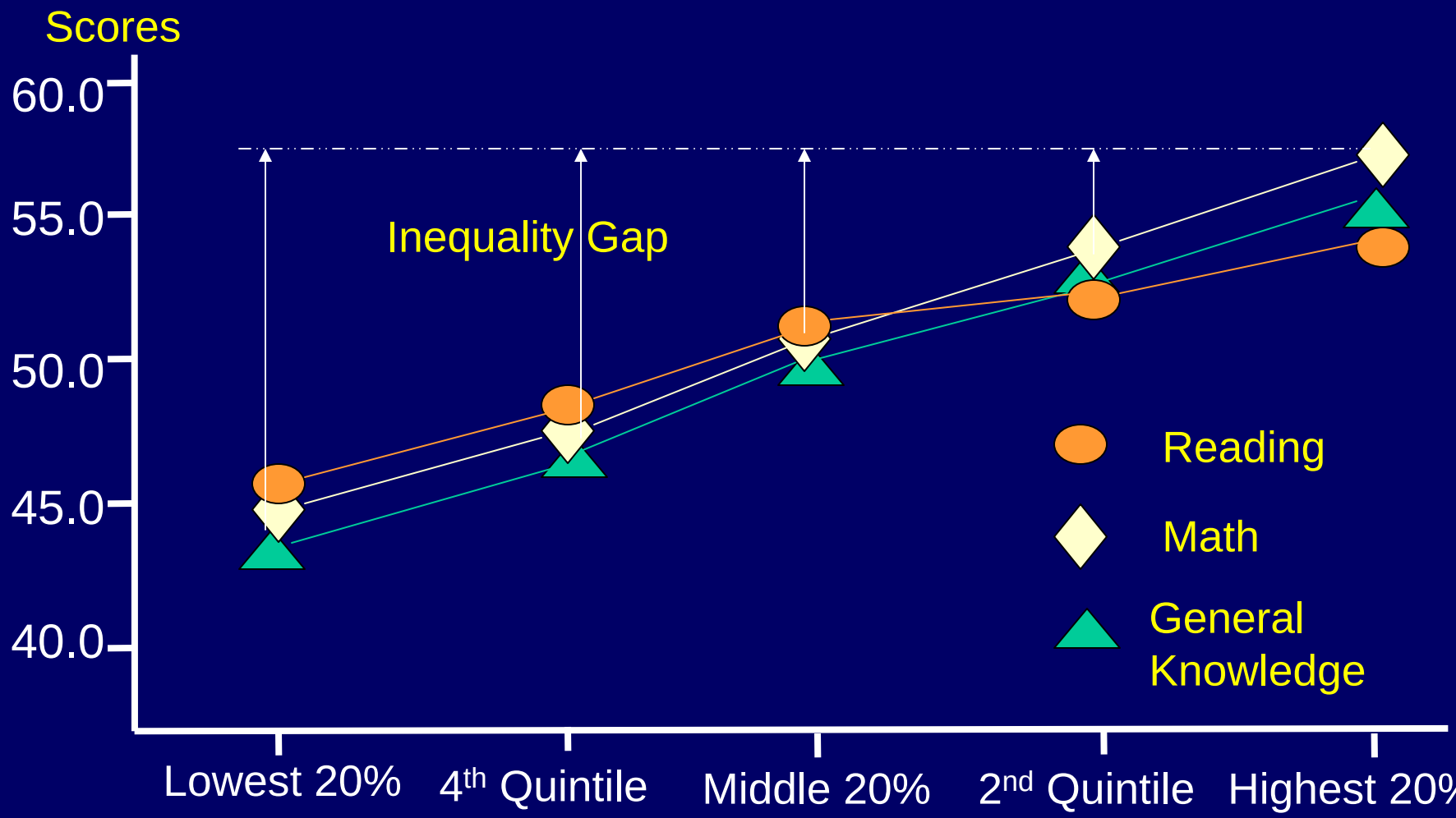
New Zealand Education Study

Student Retention at Ages 5, 8, 14

	Highest Quartile			Lowest Quartile		
	% Above Median			% Below Median		
	Age 5	Age 8	Age 14	Age 5	Age 8	Age 14
Mathematics	83	92	87	92	92	91
Reading	76	76	94	83	90	85

NZ Council for Educational Research

Median Abilities of Children Entering Kindergarten by Family Income



Barnett 2007.
US Dept of Education 2002.

Success by Ten
Early Child Development

- Stimulate early
- Stimulate often
- Stimulate effectively

Ludwig and Sawhill,
Brookings Institution

Early Child Development and Parenting Centres

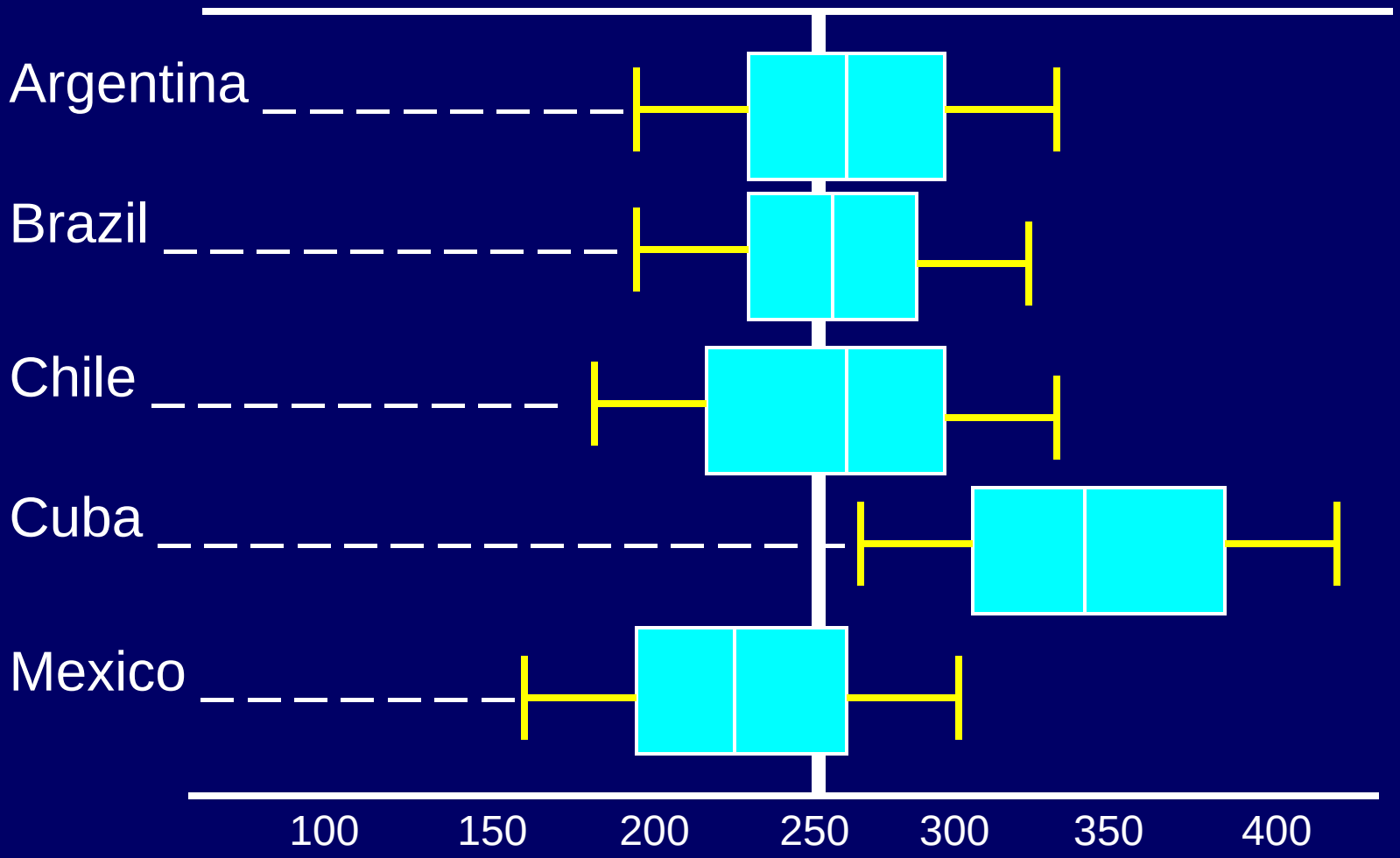
- Available from pregnancy to school entry
- Provide support for parents including non parental care
- Provide home visits
- Learning parenting by doing
- Integrated with primary schools and developmental health

School Success Index

	School Success Rank
Cuba	1
Chile	4
Colombia	19
Ecuador	20
Mexico	29
Brazil	50

Save the Children 2009

Grade 3 Language Scores

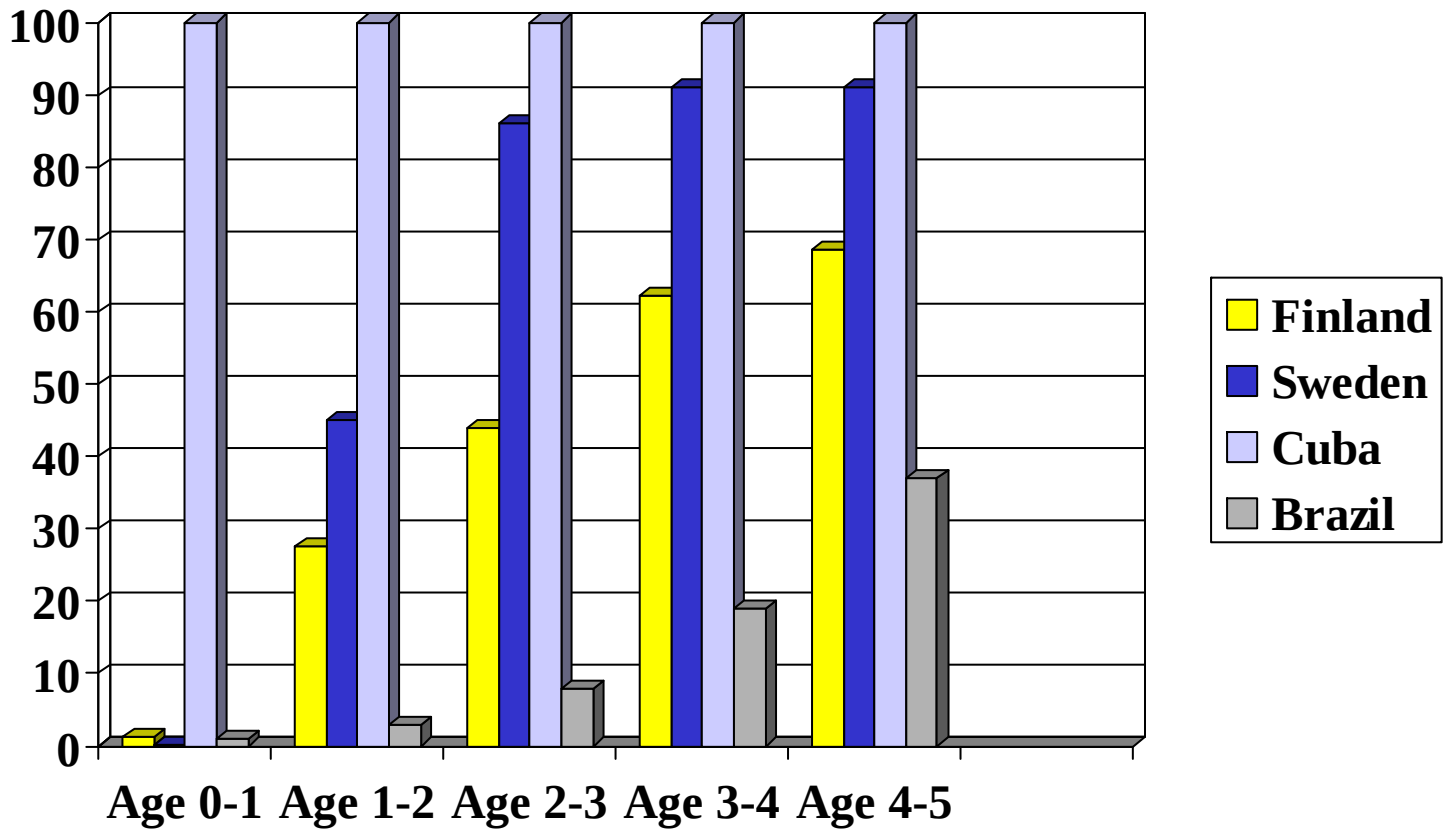


UNESCO, 1998

EDI – Canada and CENDI - Monterrey, Mexico

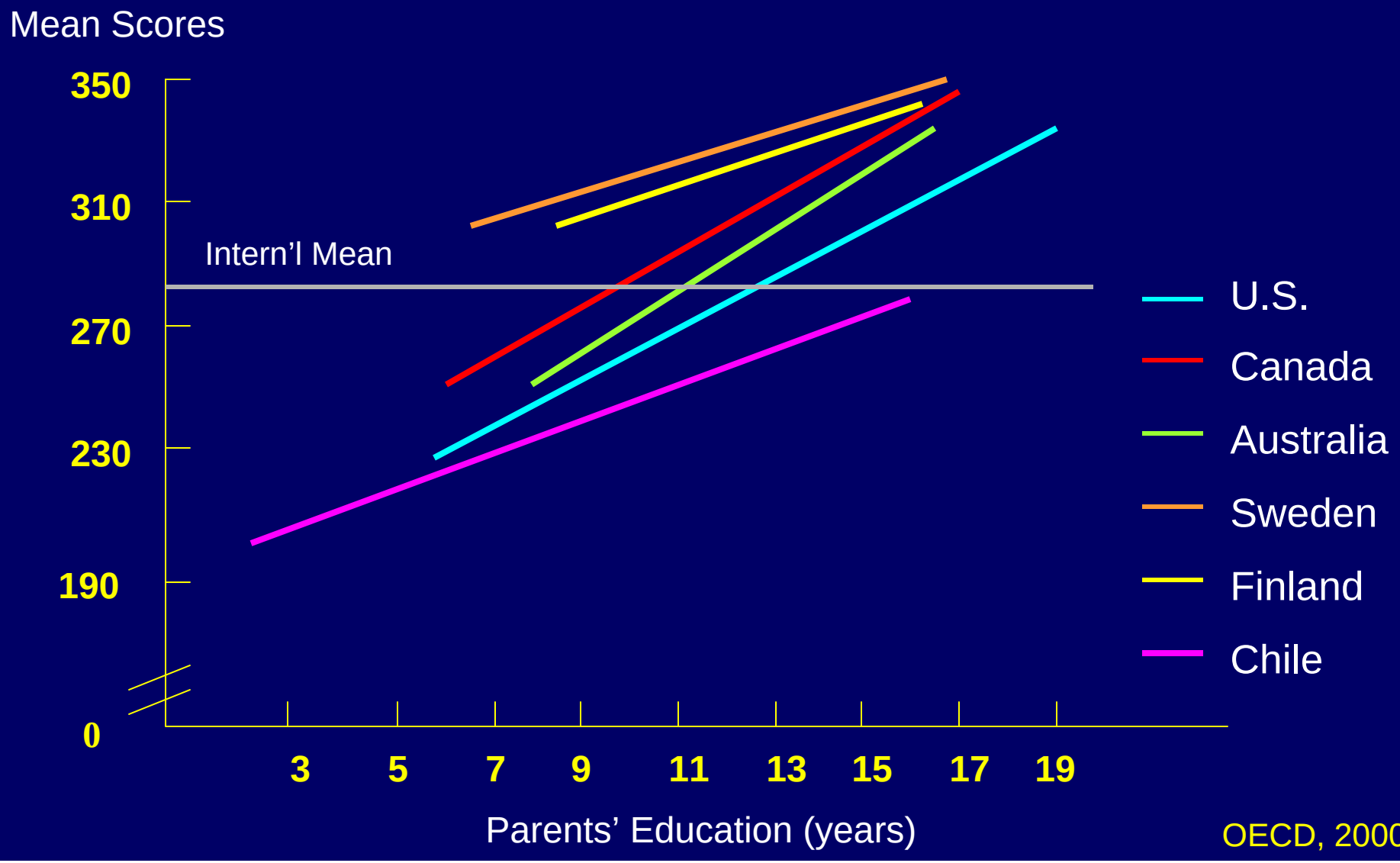
	% Low on One Domain	% Low on Two Domains
CENDI (Monterrey)	18.5%	3.8%
Canadian Sample	25.9%	12.9%

ENROLMENT IN ECD PROGRAMS



Sources: OMEP (2005), OECD (2006), UNESCO 2007, World Bank 2001

Socioeconomic Gradients for Adult Document Literacy Scores (16 to 65)



OECD, 2000

Creating Infrastructure for Early Child Development and Parenting Centres

- Support and fund integrated high quality early child development centres
- Provide relevant education and training for staff – adequate staffing for centres
- Establish outcome measures
- Parental leave policies
- Centres should be accessible, available, and affordable for all families and linked to the primary schools

Cost to Individuals and Canadian Society of Poor Early Child Development (estimates)

Crime and Violence	$120 Billion/year
Mental Health Behaviour and Drug Use	$100 Billion/year

Cost of Universal ECD-P Centres Canada (0 to Grade 1)

Age 0 to 6 Population

Universal (2,100,000 children)
Not compulsory

Cost $18.0 Billion (1.5% of GDP)
(80 to 90% participation)

Present Expenditure 0.25% of GDP

Public Expenditure Families per Child under 15

	% GDP/capita
Sweden	22.9
Denmark	19.4
Finland	18.0
U.K.	11.8
Canada	3.41
USA	2.43

J. Lynch, 2006

Sweden GDP/capita US$28,100

Use of 0-6 program:

45% age 1-2 years

86-96% age 2-6 years

Canada GDP/capita US$30,700

Use of 0-6 program:

24% age 0-5 years have access to regulated daycare

Sweden ECD (Preschool) and Education Expenditure

	Cost/Child	Enrollment
Preschool* (age 1-6)	$15,000	2+ yrs >86% (not compulsory)
Compulsory Education (age 7-16)	$10,500	Compulsory

* Maternal and parental paid leave 1-1/2 years

Skolverket 2006

Integration of Child Development Programs with Education

- Sweden
- Cuba
- South Australia (Australia)

Policies to Foster Human Capital

"We cannot afford to postpone investing in children until they become adults nor can we wait until they reach school - a time when it may be too late to intervene."

Heckman, J., 2001
(Nobel Prize Economics, 2000)

Developed Countries
Early Child Development Report Card

	Benchmark	% In Preschool (3-4yrs)
BEST IN CLASS (5 countries)		
Sweden	10	84
Denmark	8	94
AVERAGE EFFORT (12 countries)		
New Zealand	6	91
United Kingdom	5	90
FALLING BEHIND (7 countries)		
Mexico	3	53
United States	3	48
Canada	1	< 25

Save the Children 2009

World Health Organization

Michael Marmot

Inequalities in Health and Development

Closing the Gap in a Generation

WHO, August 2008

Chapter 5 – Equity From the Start

Science of Early Child Development

"The science of ECD shows that brain development is highly sensitive to external influences in early childhood starting in utero with life long effects."

WHO, 2008

WHO – Marmot Commission on Social Determinants of Health

Chapter 5 – Equity from the Start

Recommendation 5.1:

WHO and UN Children's Fund (UNICEF) set up an interagency mechanism to ensure policy coherence for early child development such that, across agencies, a comprehensive approach to early child development is acted on.

Recommendation 5.2

The Commission recommends that:

Governments build universal coverage of a comprehensive package of quality early child development programmes and services for children, mothers, and other caregivers, regardless of ability to pay.

WHO, August 2008

Elizabethan Poor Laws – year 1601
(UK, USA, Australia, Canada, New Zealand)

- Families should be self reliant and care for their own needs.
- Do not invest in children and families to prevent problems.
- Tend to address problems only after they have occurred.

Halfon 2009

Free Market Capitalism Choices

- Without social accountability
- With social accountability

To move Canada to a universal child development program, we will need to have support of:

- Our communities.
- Our local government.
- Our provincial governments.
- Government of Canada.

How can we persuade Canadian society during this economic change to invest in the future quality of Canadians to achieve equity in human development and be competitive in the new knowledge based global economy?

We know what to do.

www.founders.net

To download this presentation, go to:
Slides - Slide Shows