

Healthy Development Adelaide

Adelaide, South Australia

From Early Child Development to Human Development

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Adelaide Thinker in Residence

March 13, 2007

Presentations

Talk 1: Early Child Development & Research

Talk 2: No Data, No Problem, No Action

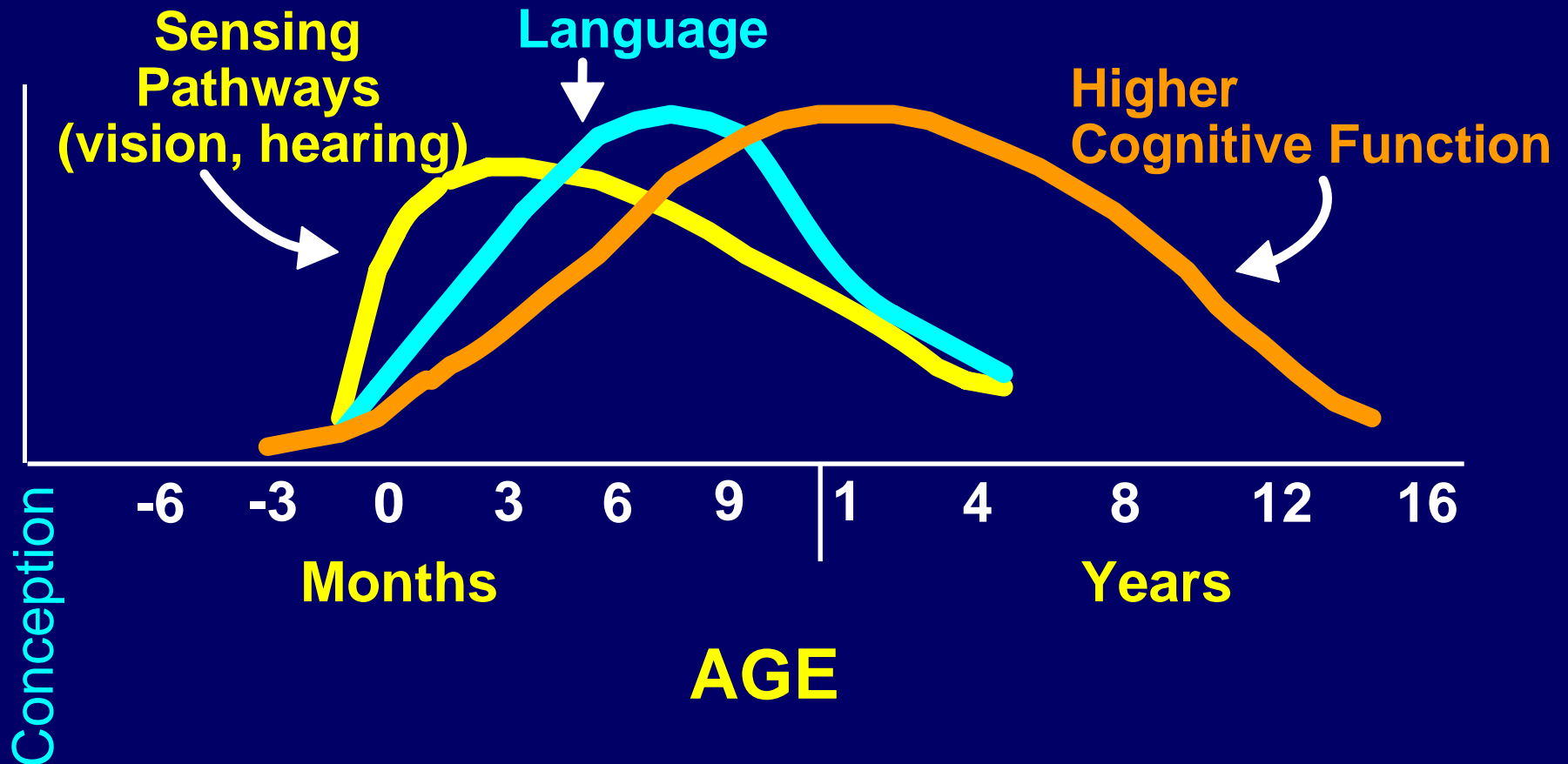
Studying the Trajectories in Health, Learning and Behaviour

Experience-Based Brain Development in the Early Years of Life Sets Neurological and Biological Pathways throughout life that affect:

- Health
- Learning
- Behaviour

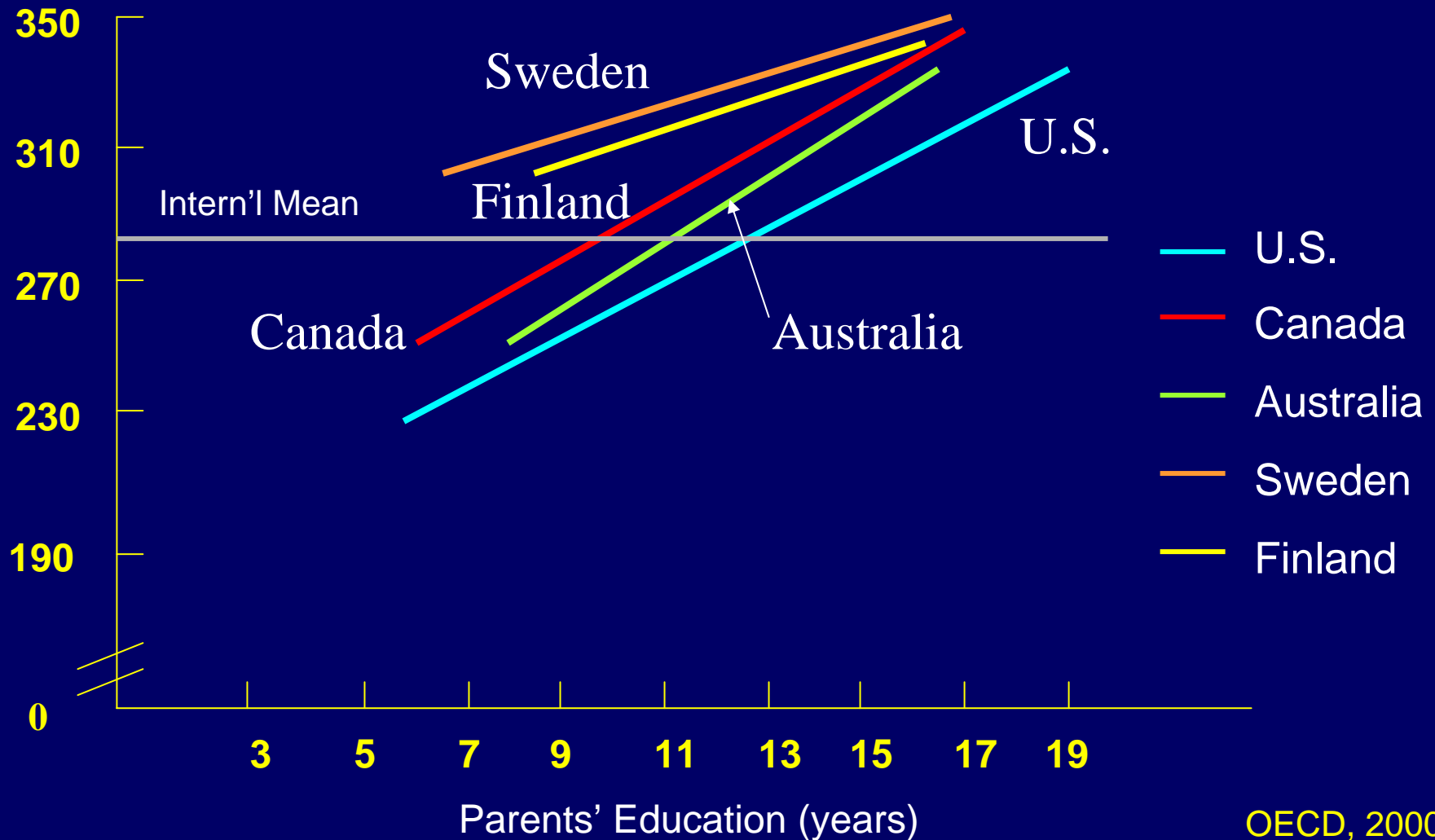
NEUROSCIENCE

Human Brain Development – Language and Cognition



Socioeconomic Gradients for Document Literacy Scores

Mean Scores



**Can you Change the
Gradients in Language
& Literacy
Significantly in the
School System?**



Vancouver

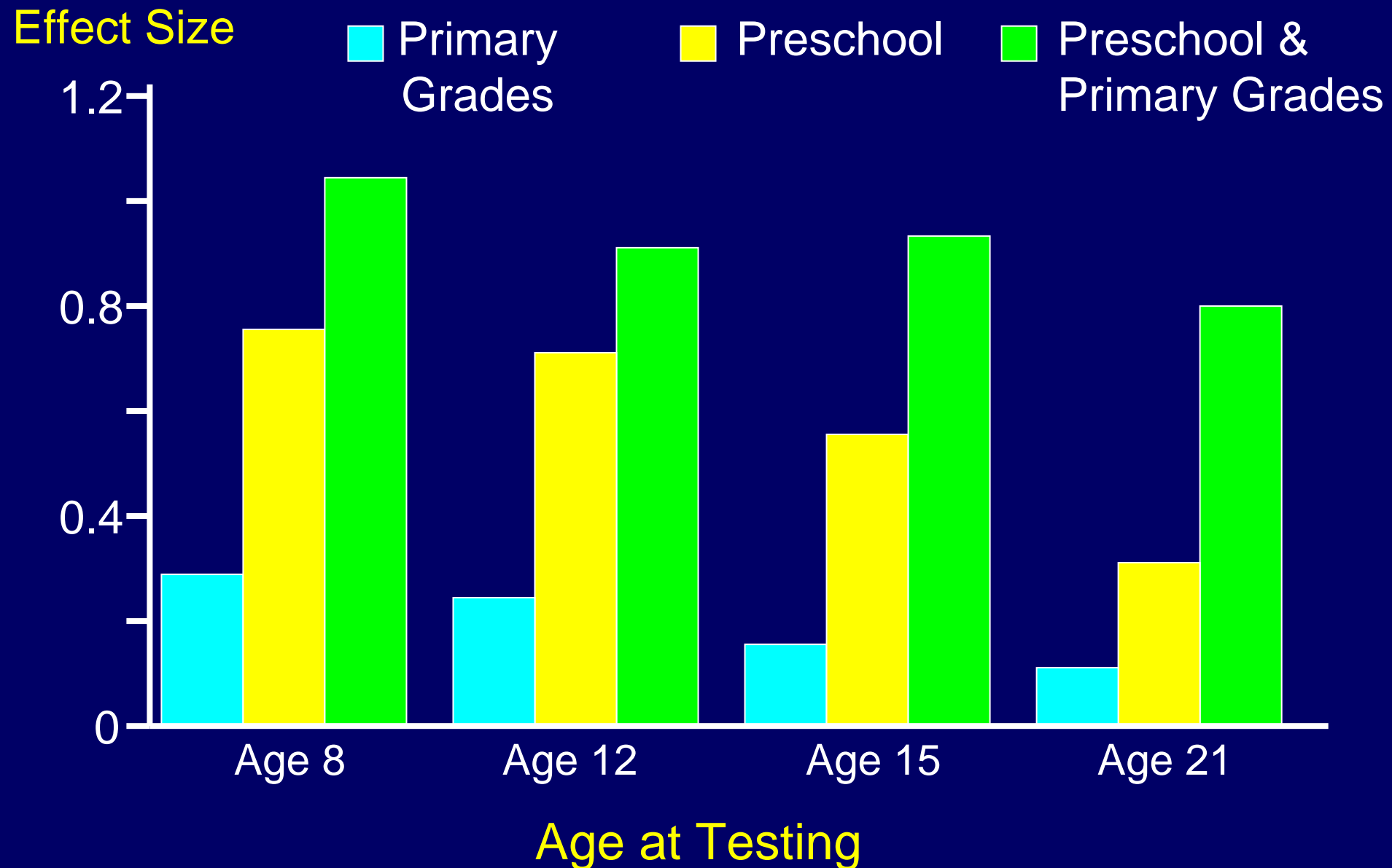
Grade 4 and Grade 7 Tests

Proportion of children failing to meet Grade 4 and Grade 7 test standards correlates strongly with proportion of children vulnerable on the EDI index at time of school entry.

John Mighton

- JUMP
The Myth of Ability
- Can this improve Mathematics in
Schools with low AEDI Scores?

Abecedarian Study – Reading



Dyslexia

Ages 6 to 9

- Phonological reading intervention – 8 months
- Significant and durable (1 year) changes in brain organization
- Improved reading fluency

Early Child Development and Language

- Brain development starts early – first 7 months
- Sets capability for mastering multiple languages
- Sets literacy and language trajectory

Kuhl concluded that the speech system remains most plastic in the early stages of life.

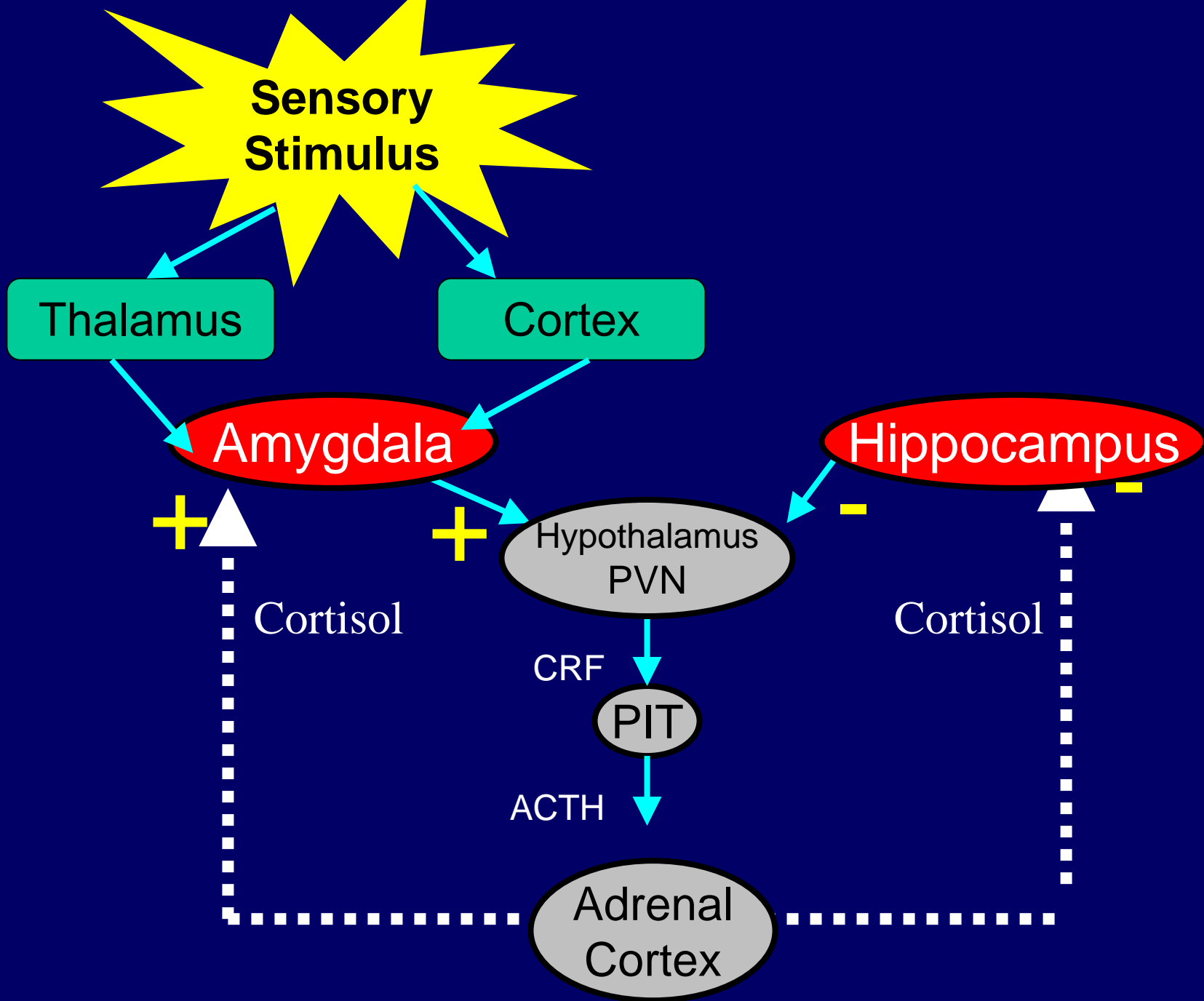
Brain Pathways

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

Allostasis & Allostatic Load

t

[Stress]



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

Sensory Pathways and the Limbic HPA Pathway

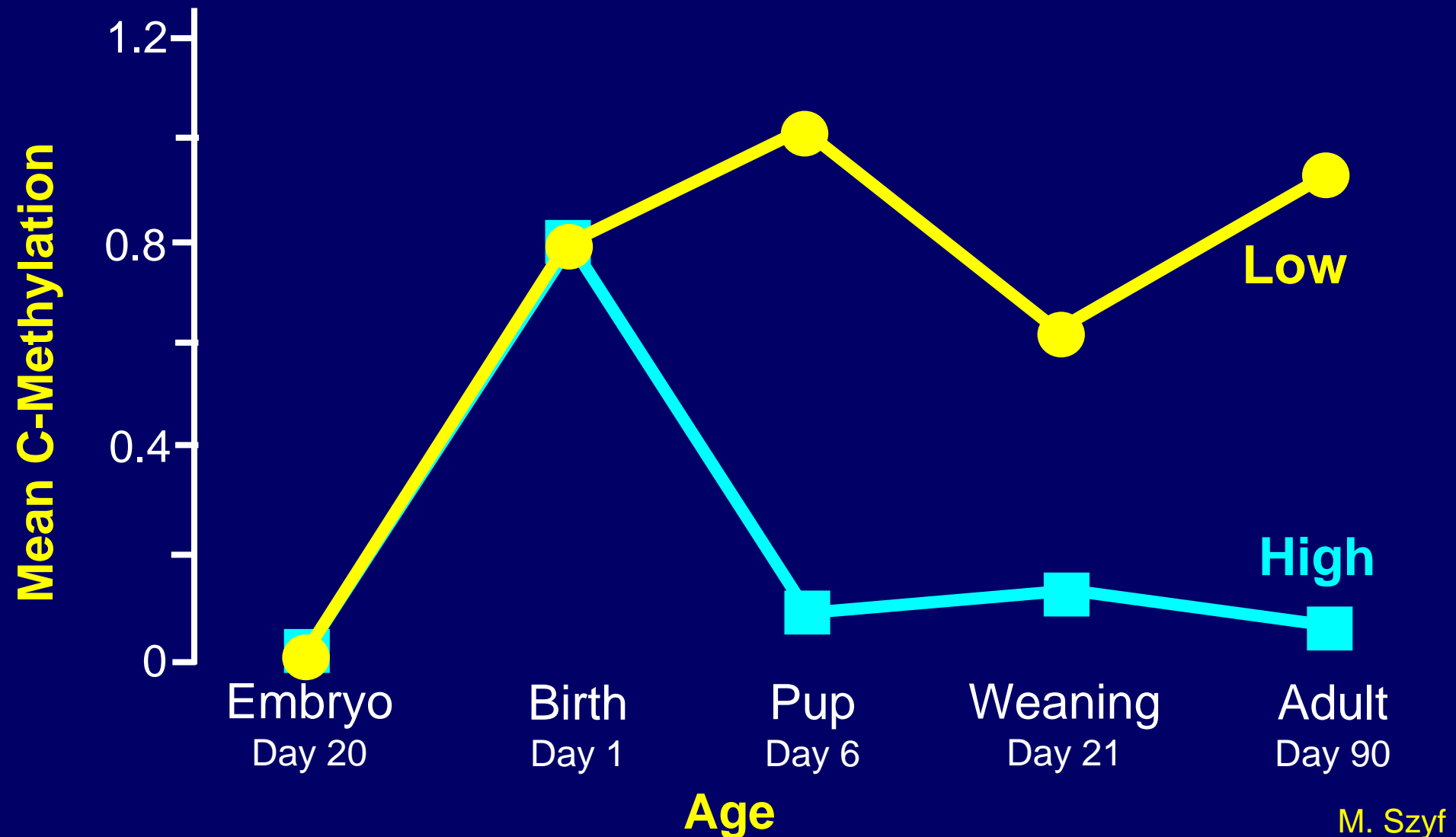
Touch and Other Sensory
Pathways in the Early Period are
Critical Pathways

- Rats – Mothers licking pups
- Monkeys – Peer vs mother rearing
- Humans – Attachment
-- Prematurity

Epigenetics

According to Dr. Szyf, epigenetic modifications in response to maternal care occur early after birth – critical period. The effects are stable and persist into adulthood.

Hippocampal GR(1₇) Region 16 (5' NGFI-A RE) Methylation Timeline



1958 British Birth Cohort

Age 45

- Cortisol pathway response correlates with ECD.
- Children with poor math skills at 7-16 years have dysfunctional cortisol secretion patterns at age 45.

**Low Birthweight Babies
Have Higher Plasma Cortisol
Levels as Adults.**

J.R. Seckl

Swedish Longitudinal Study – Early Child Development (ECD) and Adult Health

Number of Adverse ECD Circumstances*

0 1 2 3 4

Adult Health

Odds - Ratios

General Physical	1	1.39	1.54	2.08	2.66
Circulatory	1	1.56	1.53	2.91	7.76
Mental	1	1.78	2.05	3.76	10.27

* Economic, family size, broken family and family dissention

Socio Economic Status Genetic Variation and Central Nervous System Serotonin Response

- An SES Gradient
- Correlates with CHD

**Integrated Data Base
Health, ECD, Education**

**Manitoba Centre for Health
Policy**

Integrated Population Data Record

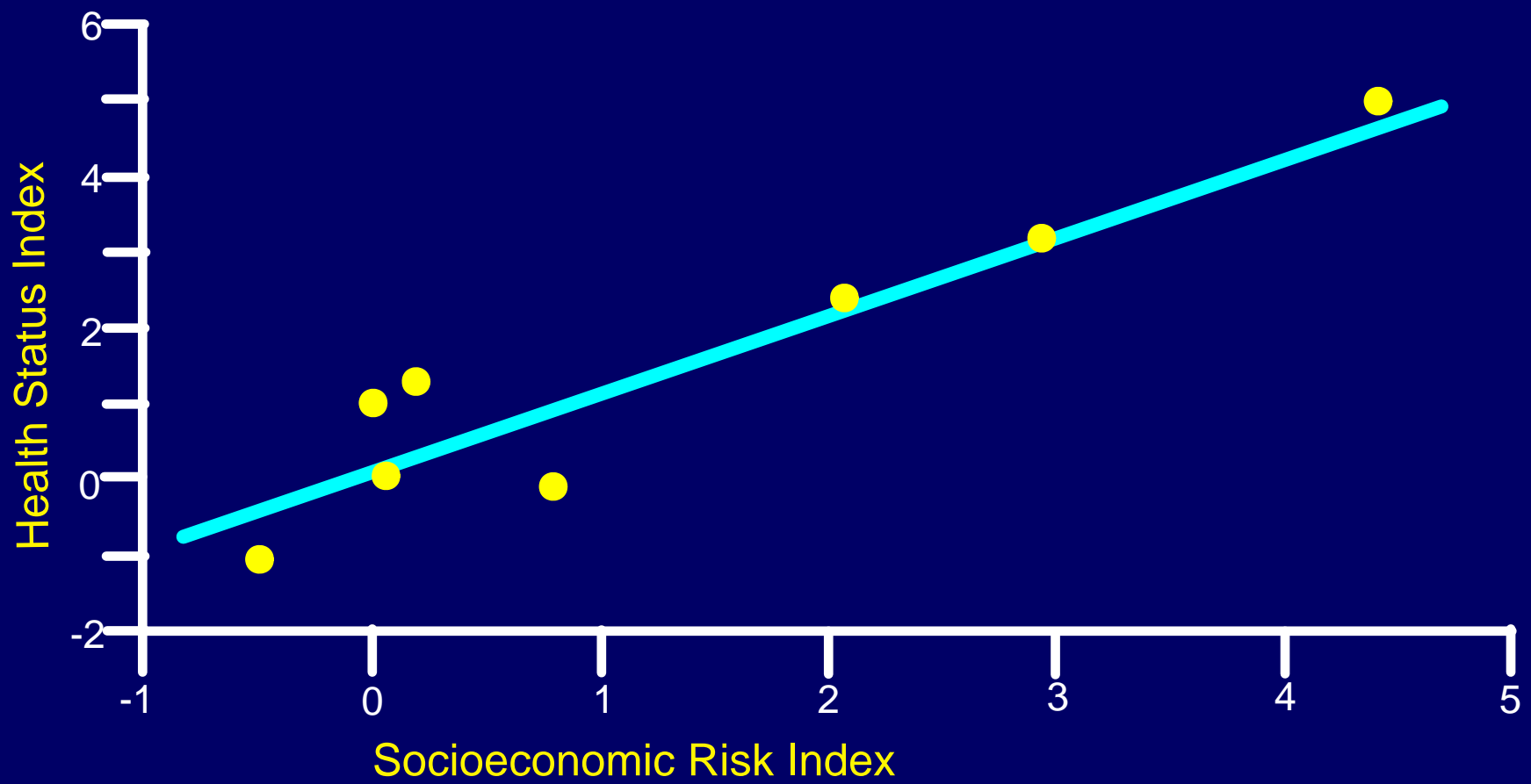
British Columbia and Manitoba

- Pregnancy
- Birth and infancy
- Development (EDI)
- Education
- Adult health and well-being

Health Status Winnipeg 1986 and 1996

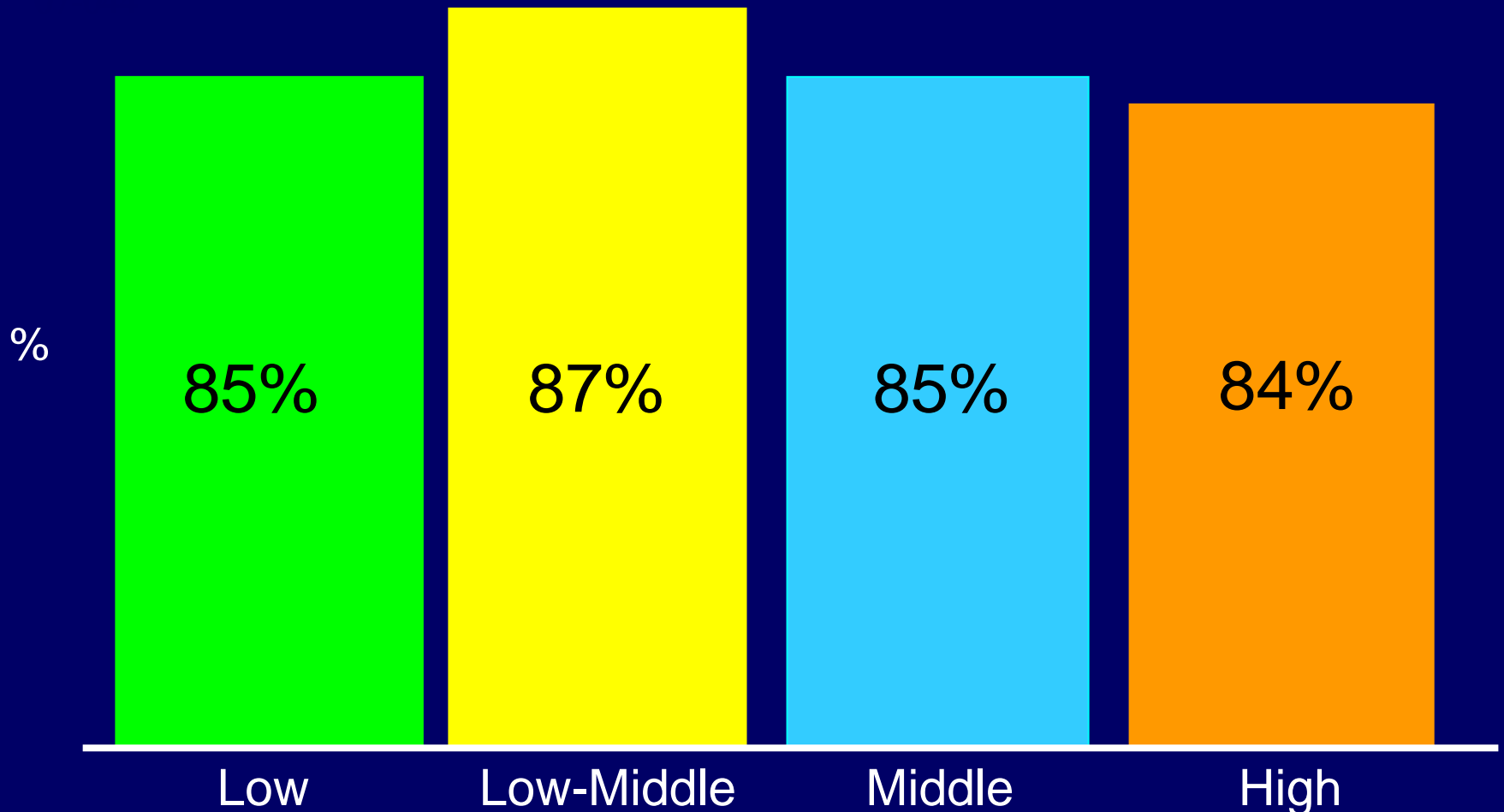
		<i>Education Level</i>				
		Q1	Q2	Q3	Q4	Q5
Mortality (Deaths/1,000)						
	1986	8.73	7.93	7.45	7.17	7.00
	1996	8.83	7.53	7.26	6.88	5.99
Premature Deaths/1,000						
	1986	5.39	4.69	4.10	4.07	3.85
	1996	5.35	4.13	3.95	3.65	2.92

Comparison of Socioeconomic and Health Indices, Manitoba Regions

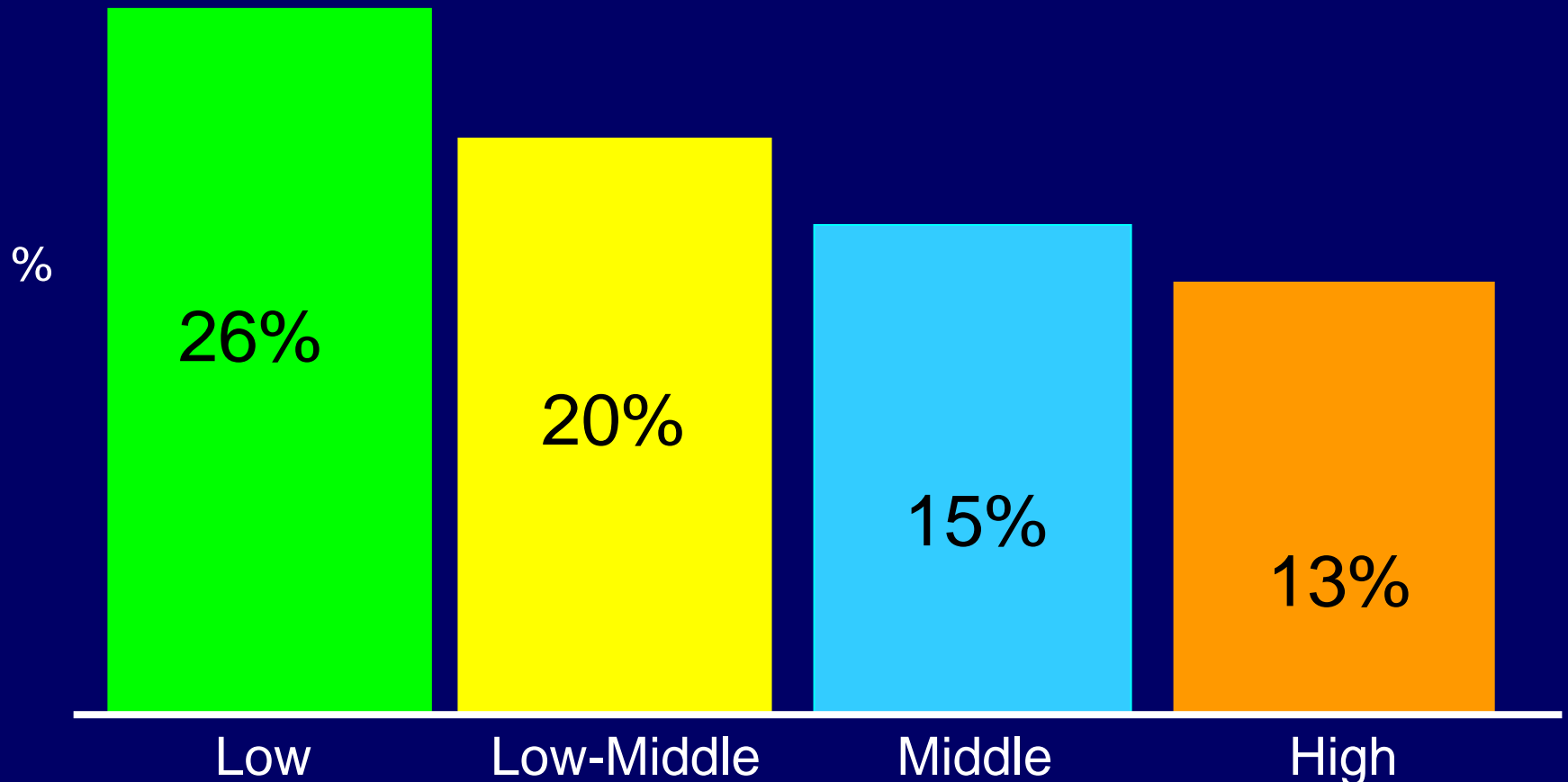


Norman Frohlich and Cam Mustard "A Regional Comparison of Socioeconomic and Health Indices in a Canadian Province" Soc. Sci. Med. Vol 42, Number 9, pp. 1273-1281, 1996

Good Apgar Scores by SES (Manitoba, 1984 Cohort)

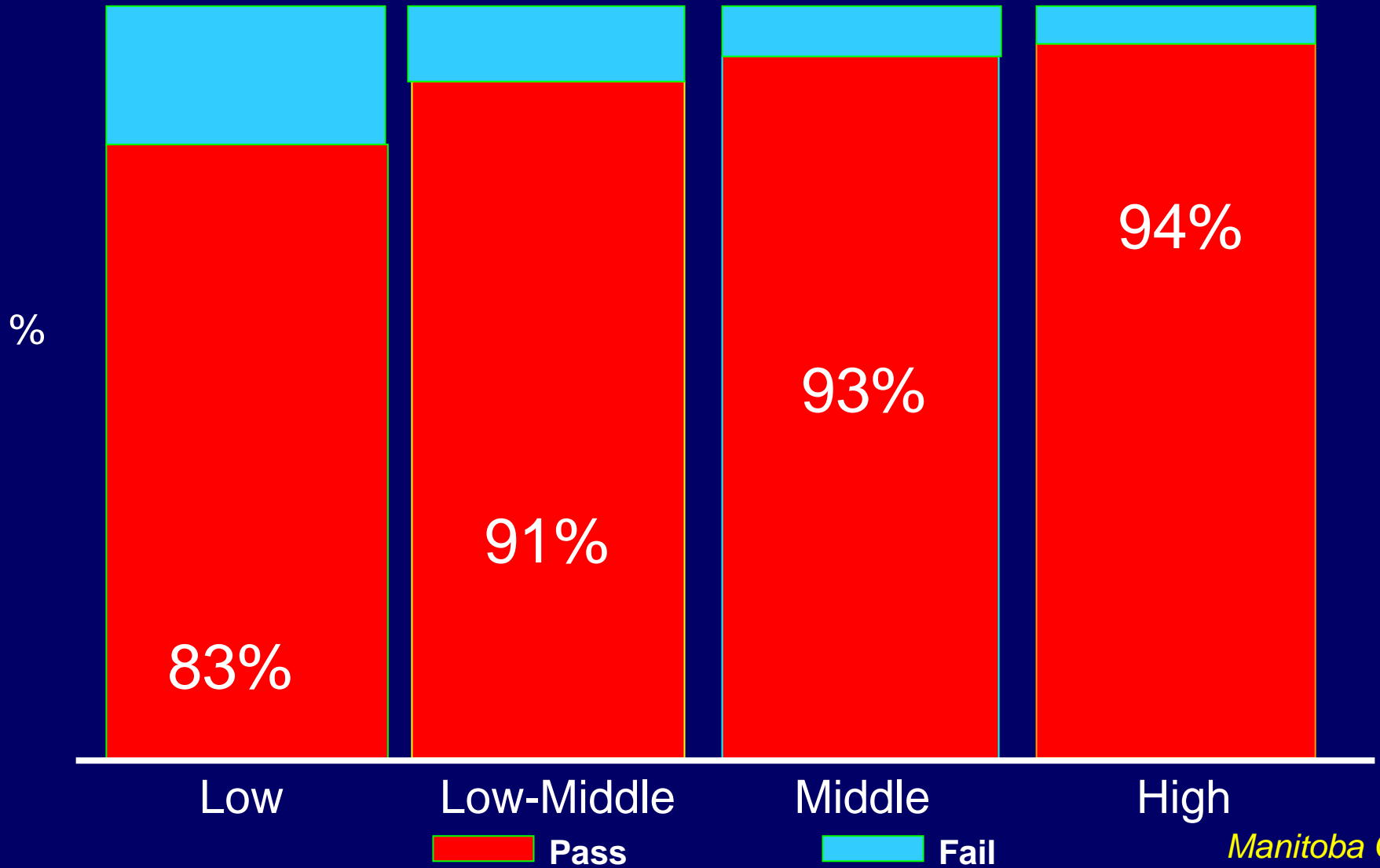


Percentage of Grade 1 Students in Reading Recovery Programs by SES

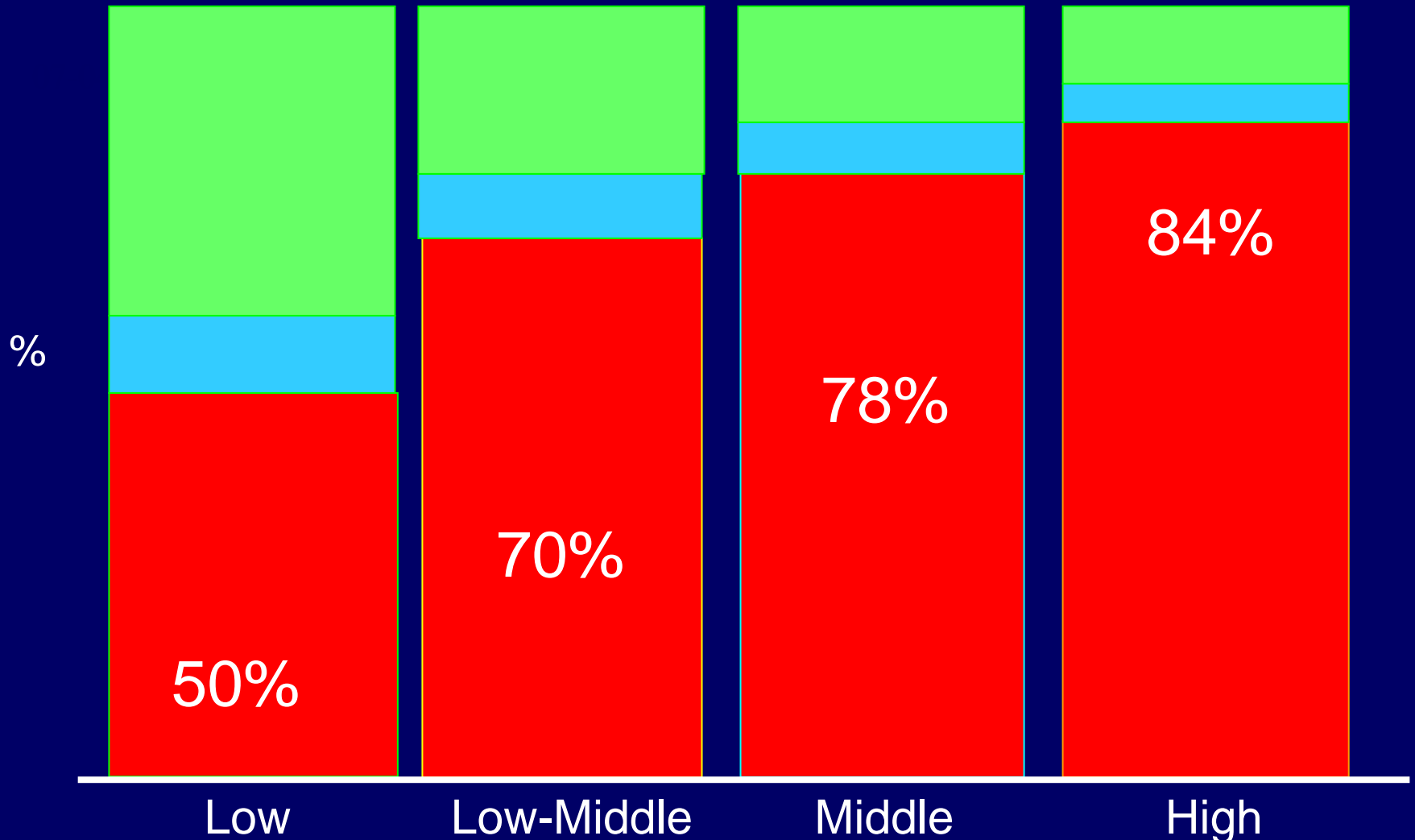


Grade 3 Performance (Language) by SES

Pass/Fail Rates of Test-writers (Winnipeg)

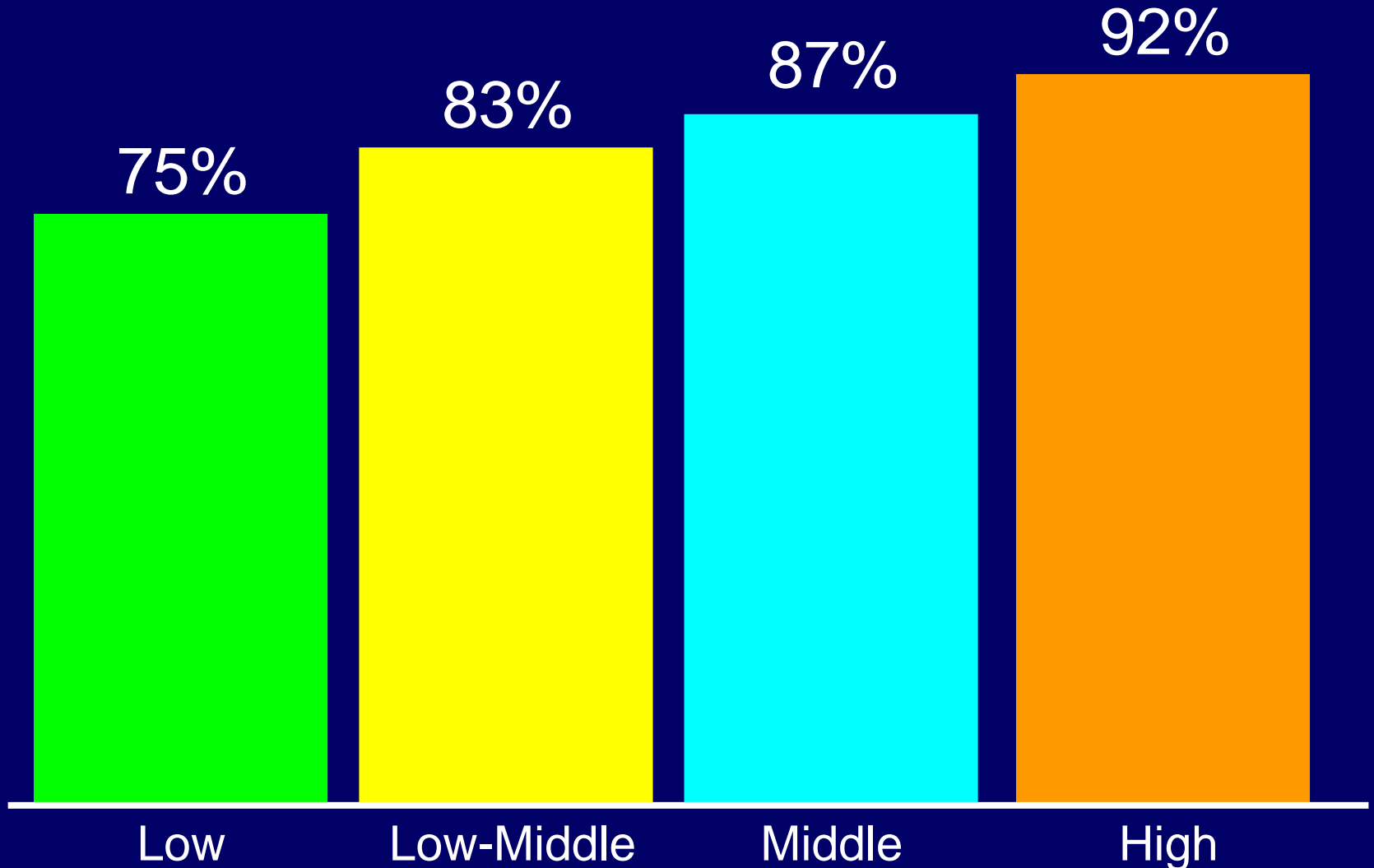


Grade 3 Performance (Language) by SES Outcomes for 8-Year Olds Who Should Have Written Test (Winnipeg)



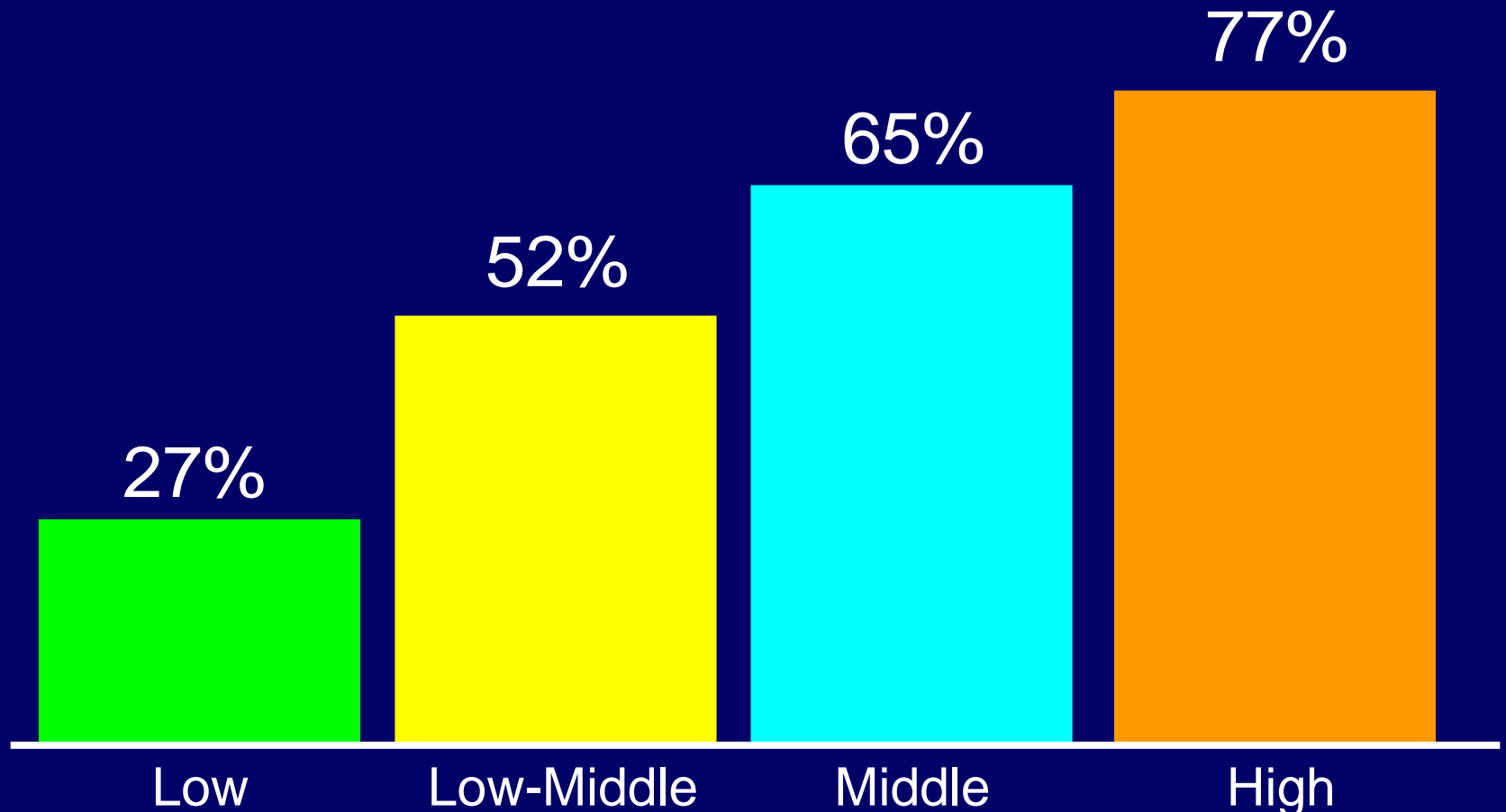
Grade 12 Performance by SES


Pass Rate of School Test (Winnipeg)



Grade 12 Performance by SES

Pass Rate of 18-Year Olds Who Should Have Written Test (Winnipeg)

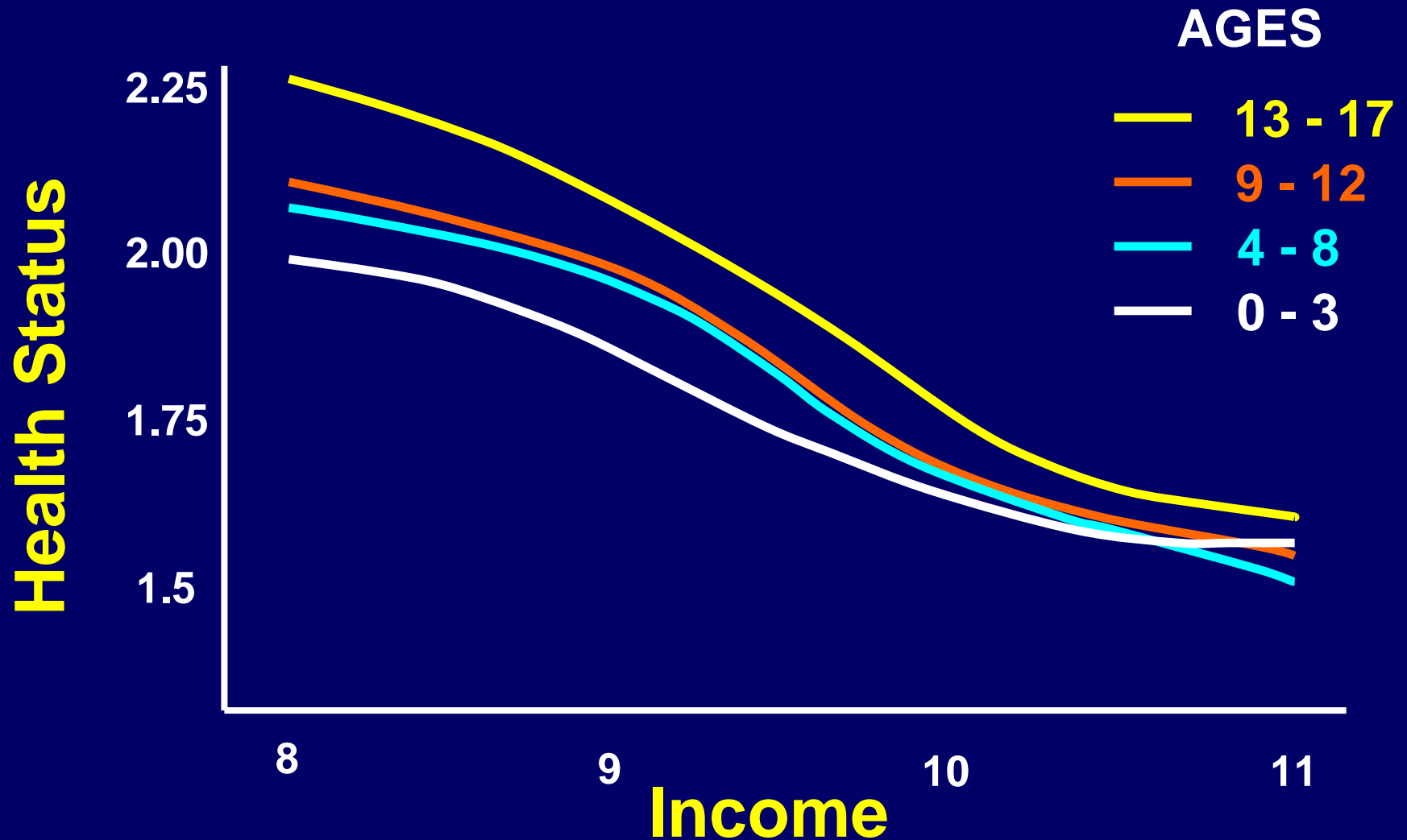




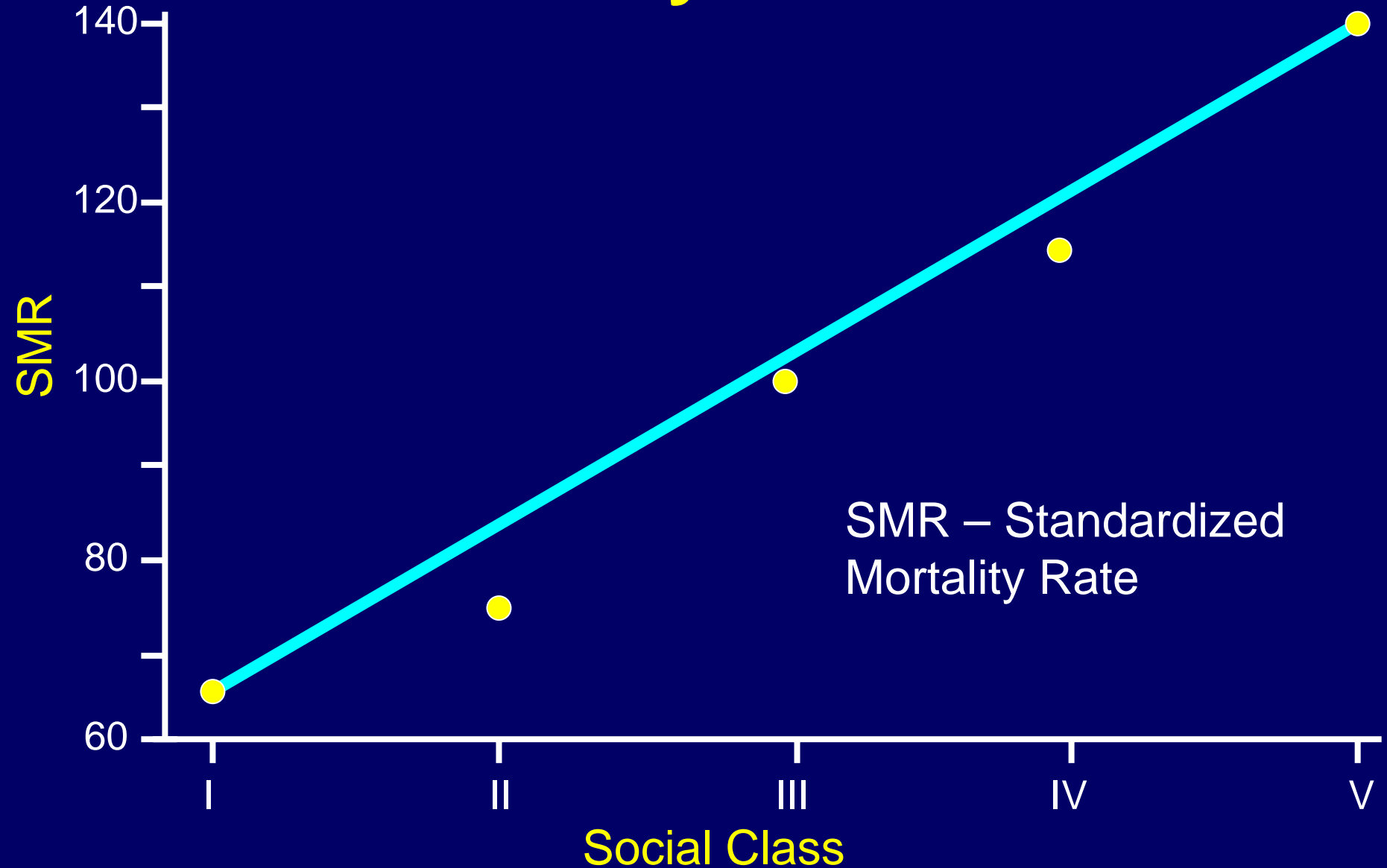
"Follow up through life of successive samples of birth has pointed to the crucial influence of early life on subsequent mental and physical health and development."

Acheson, Donald - Independent Inquiry into Inequalities in Health, 1998

Health Gradients



Socio-Economic Gradient and Mortality – Men UK



Early Development Instrument (EDI)

- Physical health and well-being
- Social knowledge and competence
- Emotional health/maturity
- Language and cognitive development
- Communication skills and general knowledge

EDI Results – Vancouver Districts

District	Income \$	EDI Results % scoring in bottom 10%
1	12,000-24,000	34.5
2	24,000-37,000	27.5
3	37,000-49,000	21.5
4	49,000-62,000	15.0
5	62,000-74,000	8.5



Vancouver Grade 4 and Grade 7 Tests

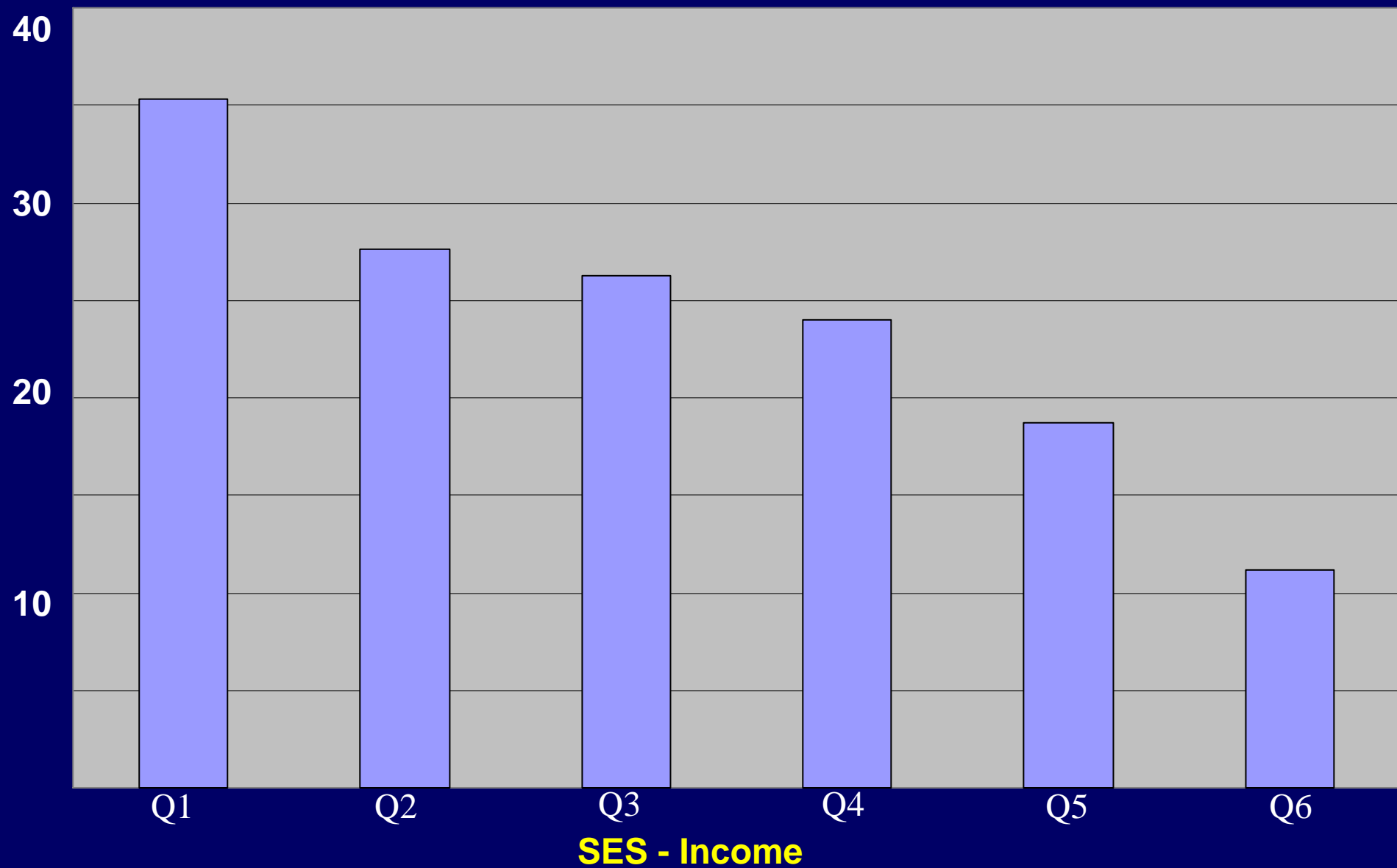
Proportion of children failing to meet EDI standards correlates strongly with proportion of children vulnerable on the EDI index at time of school entry.

Vancouver EDI Reading

# of Vulnerabilities	% Failing Grade 4	% Not Passing Grade 4
0	13.6	17.8
1	26.7	33.9
2-3	29.5	43.1
4-5	48.4	68.3

Australia – AEDI Children 5-6 yrs.

% Vulnerable



AEDI Results - SA

% Vulnerable on 1 or more Test

Roxby Downs 15.6

Port Augusta 43.1

Ingle Farm 32.5

Salisbury East 16.9

Alberton 10.5

Croydon Park 43.3

Seaton 50.0

Port Augusta

Establish Universal Early Child Development and Parenting Program 0 to 5 in 2007.

Will Improve AEDI in 4 to 5 Years.

Will Improve Education in 10 Years.

Will Improve Health in 20 Years.

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