

History of an idea 1983-2023:

“Adolescence-Limited” and

“Life-Course Persistent”

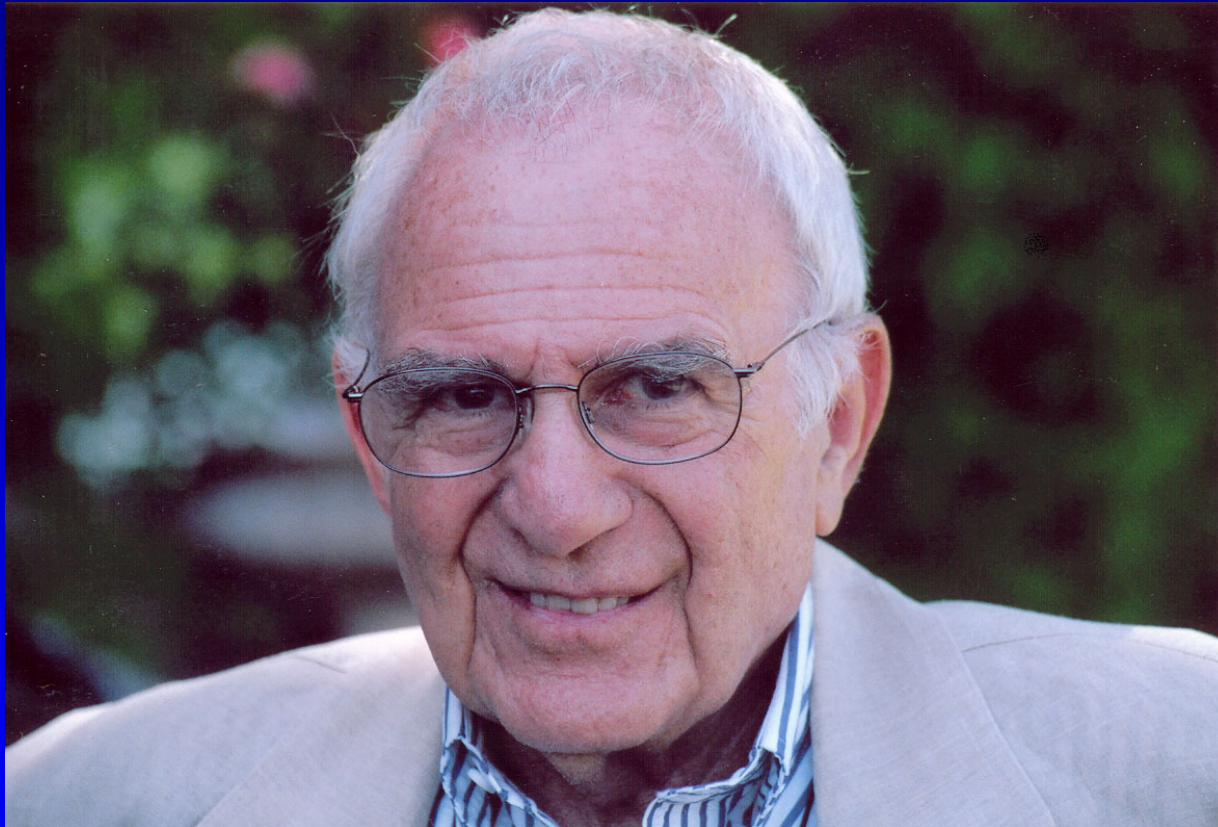
antisocial behaviour

Terrie Moffitt, October 2023

Why speak with your Board of Parole Hearings?

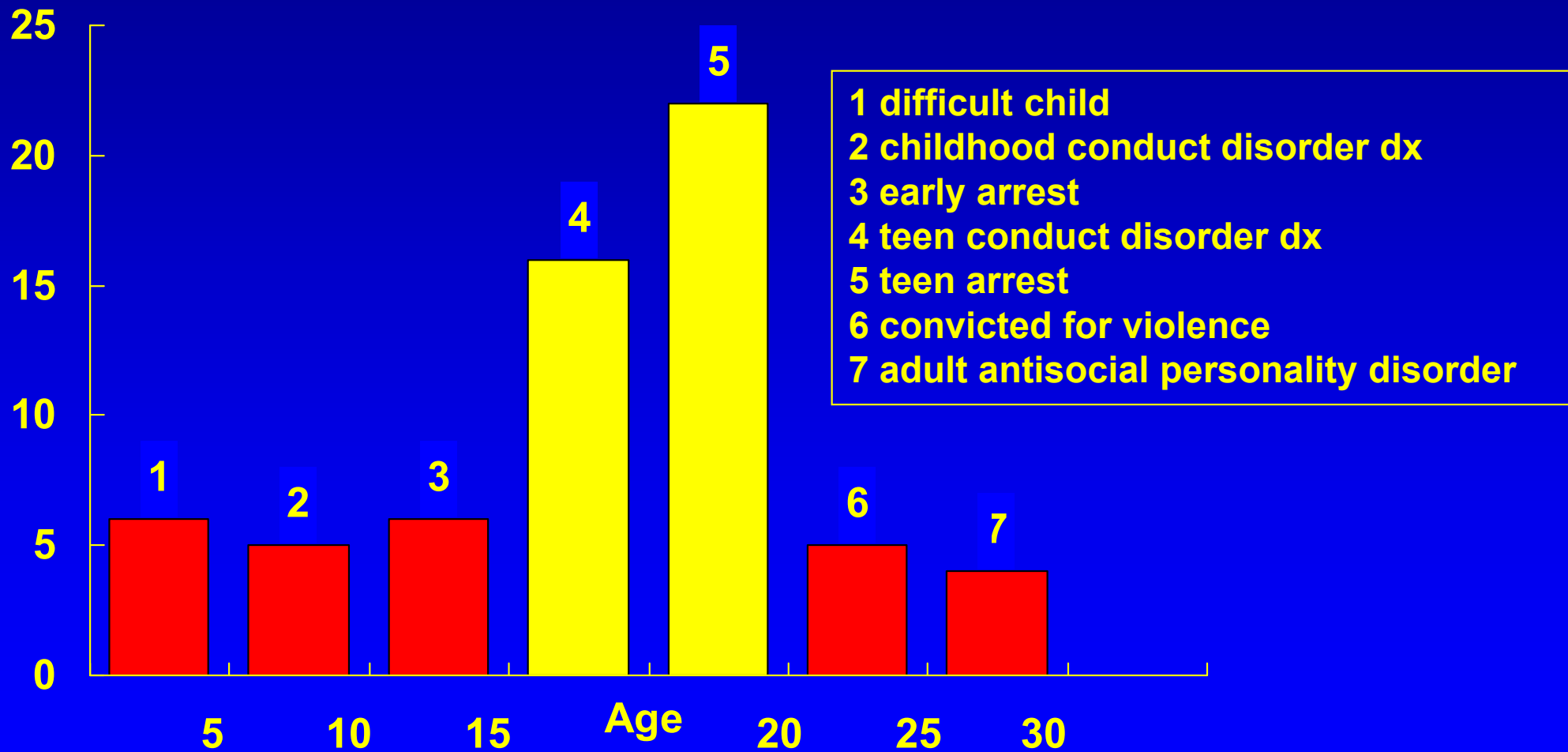
- Long road from research to application in clinical and judicial practice
- Is this research being used?
- Is use a close match to the original science?

Sarnoff Mednick

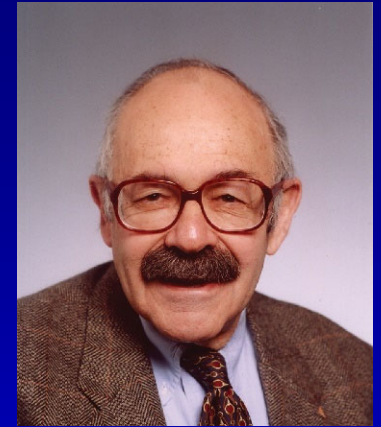
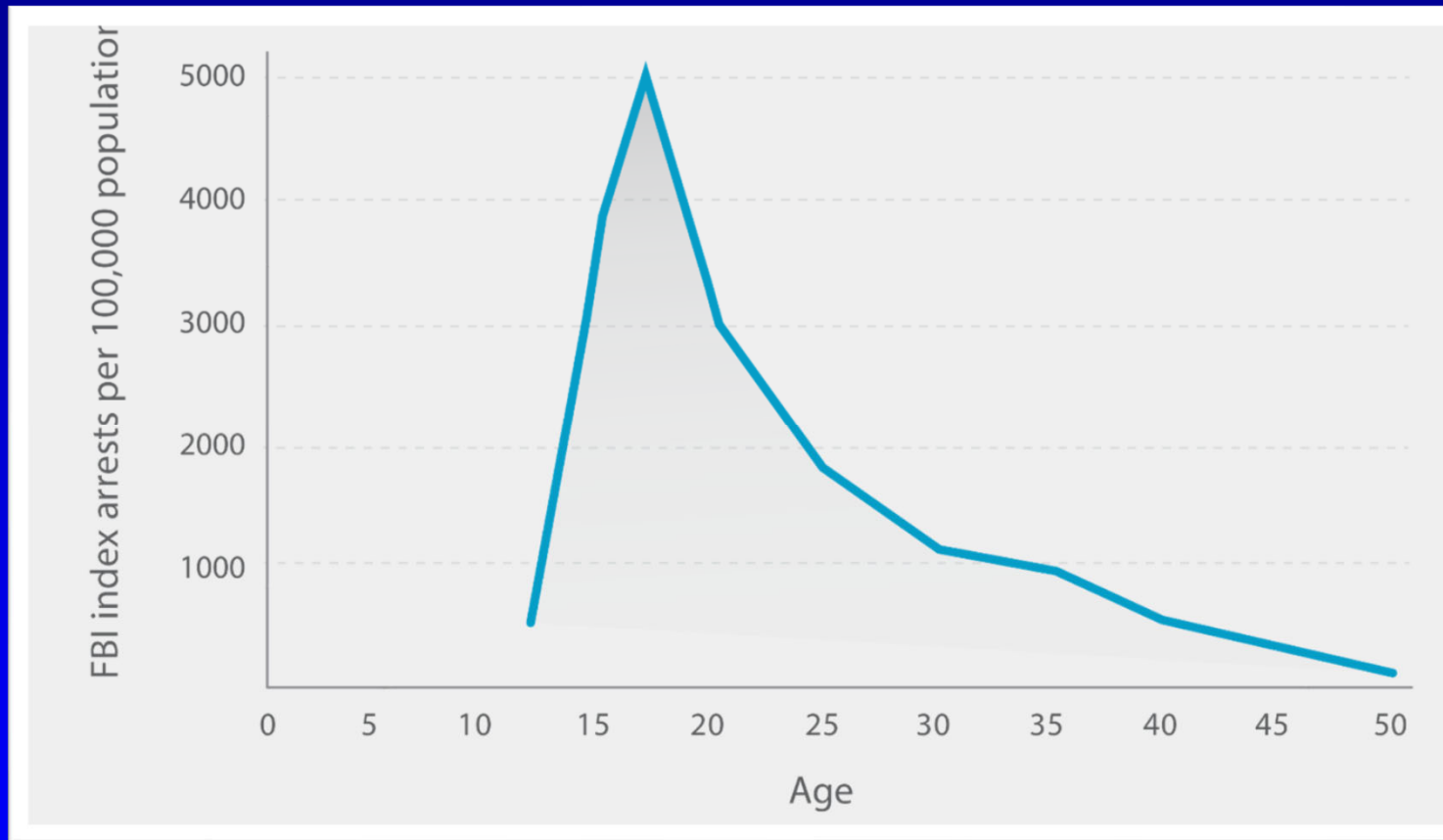


1980's: What psychology knew: The cross-sectional prevalence of male antisocial behaviour

Percent



1980's: The curve of official crimes over age



Al Blumstein,
Carnegie Mellon

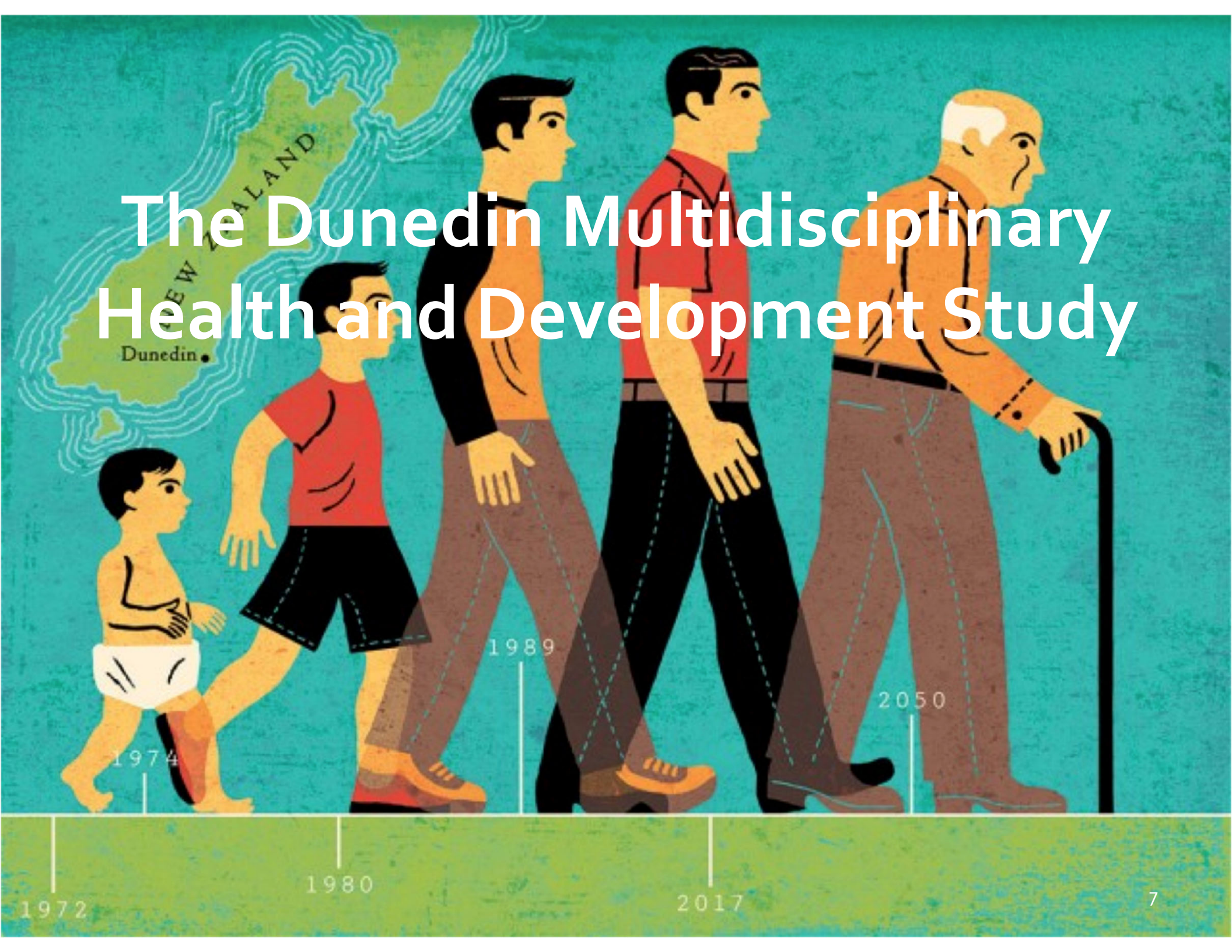


David Farrington,
Cambridge Univ.

Dunedin, New Zealand



The Dunedin Multidisciplinary Health and Development Study



Dunedin Study Design

Age	Year	Number	Percent*
Birth	1972-73		
3	1975-76	1037	100%
5	1977-78	991	96
7	1979-80	954	92
9	1981-82	955	92
11	1983-84	925	90
13	1985-86	850	82
15	1987-88	976	95
18	1990-91	993	97
21	1993-94	992	97
26	1998-99	980	96
32	2004-05	972	96
38	2010-12	961	95
45	2017-2019	938	94%
52	2024-2026	??	??

* Percent assessed,
of those who were
alive at each age.

Dunedin Study Design

Birth to
age 11

Age	Year	Number	Percent*
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Dunedin Phase 13: 1985

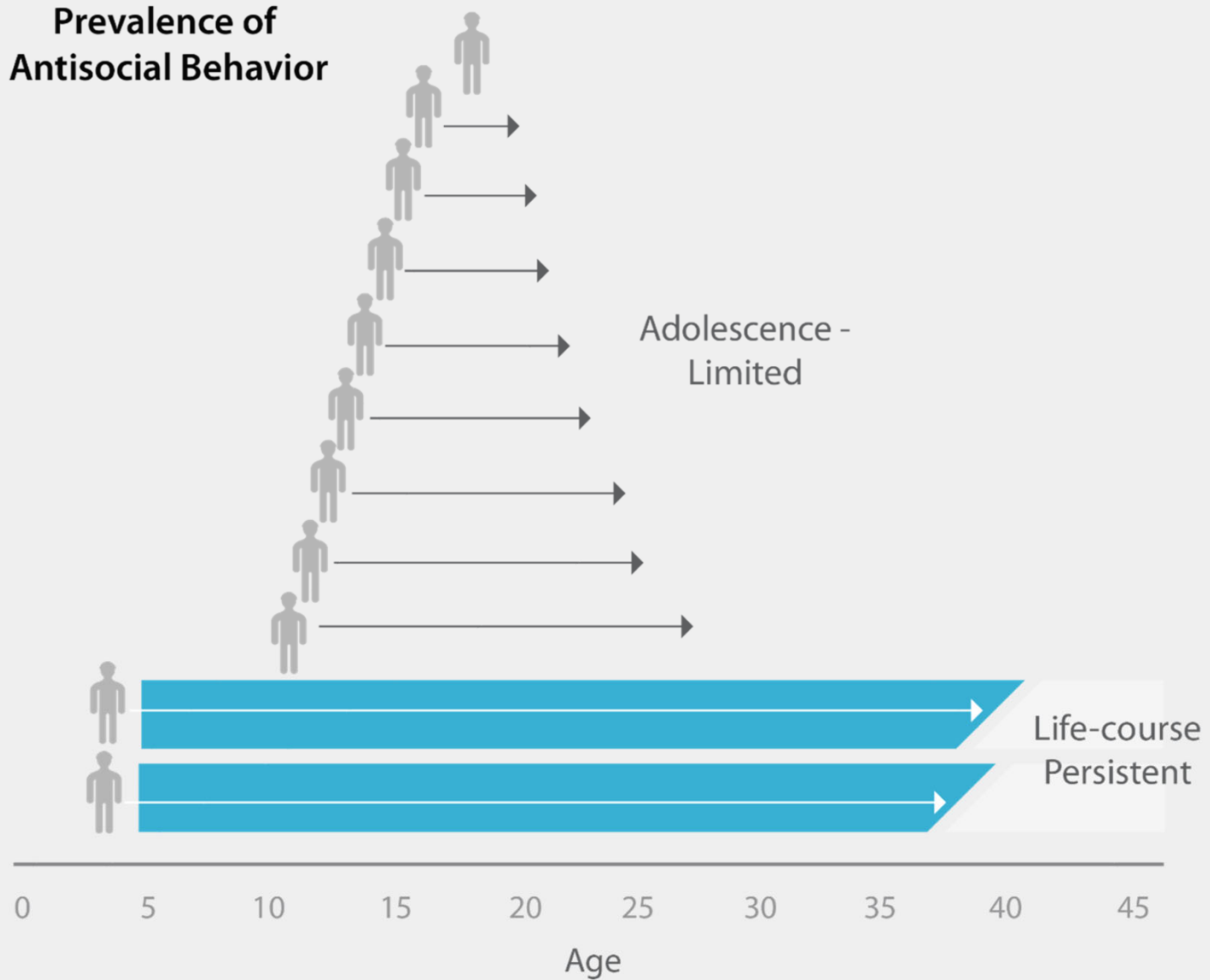


Dunedin Study Design

ages 13
and 15

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38	2010-12	961	95
45	2017-2019	938	94%
52	2024-2026	??	??

Prevalence of Antisocial Behavior



Moffitt, Child Development 1990

Moffitt, Terrie E., 1993,
Adolescence-Limited and Life-Course
Persistent Antisocial Behavior:
A Developmental Taxonomy.
Psychological Review 100:674-701.

Now cited > 13,500 times

1993 Lifecourse Persistent Theory: Social path

Neuro-developmental problems in infancy

Social inputs

difficult temperament

Weak parent-child attachment

disruptive behaviour

Ineffective discipline

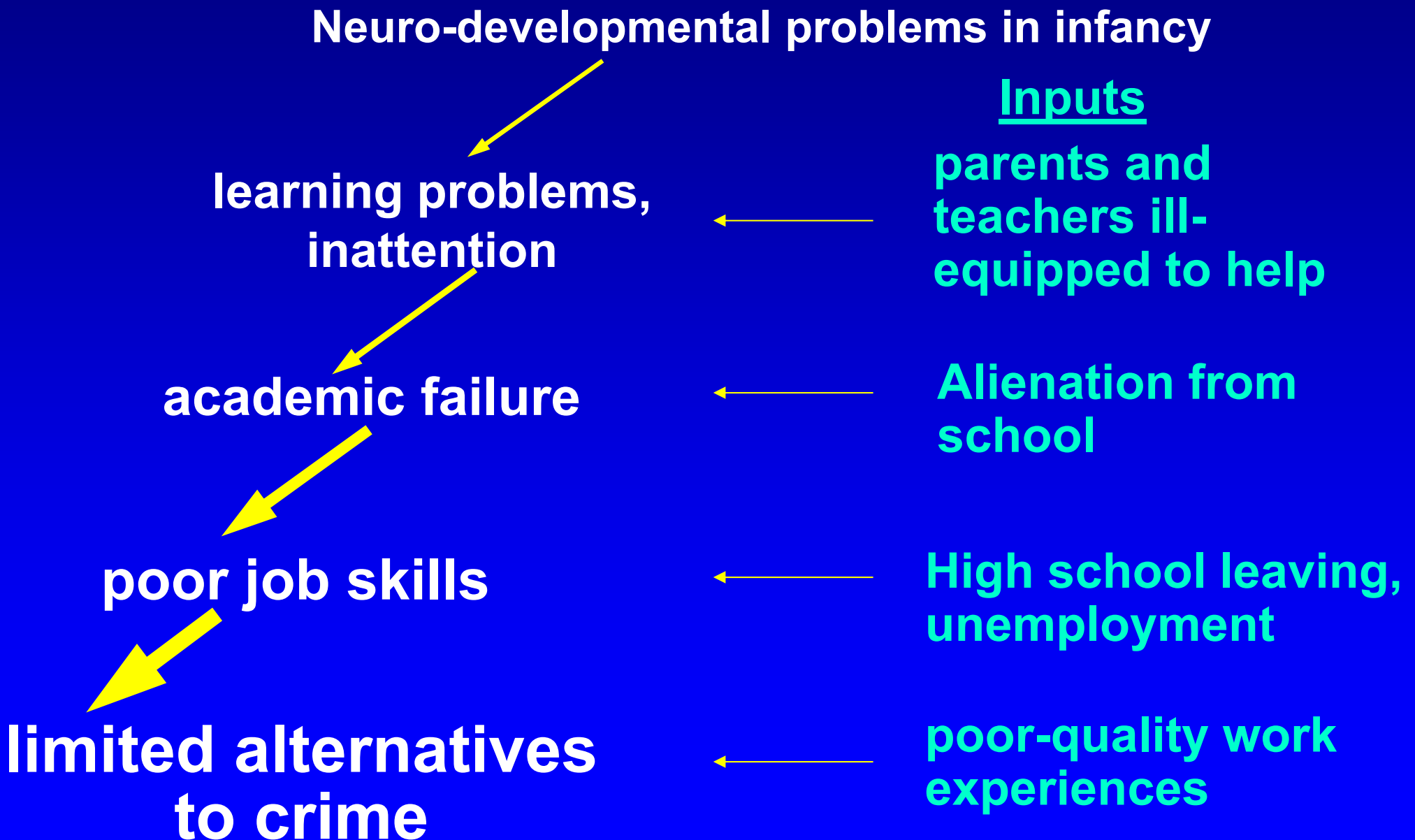
social problems

Peer rejection, troubled peers

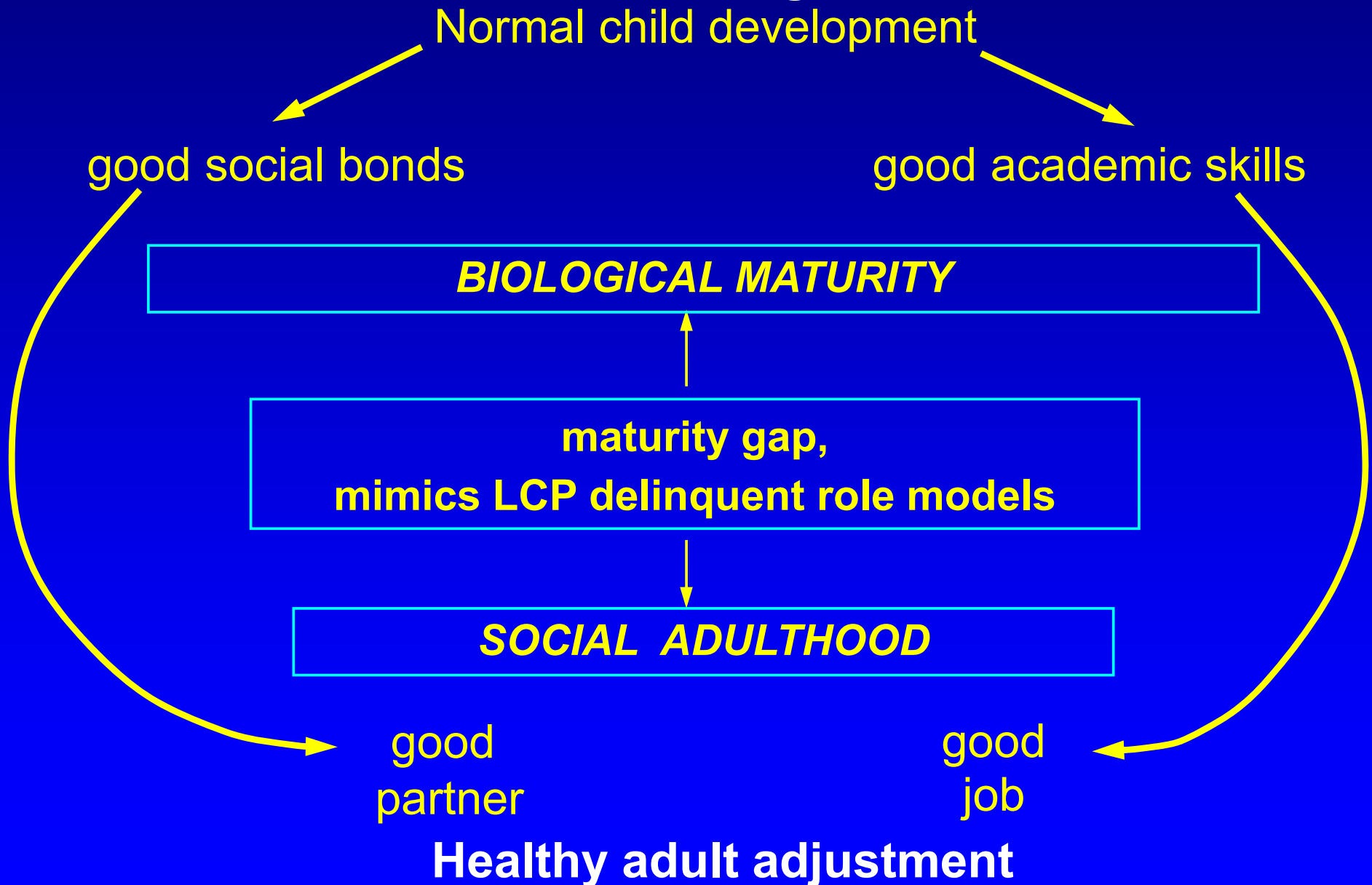
adult personality disorder

Antisocial partner

1993 LCP Theory path 2: Academic path



1993 Adolescence-Limited Theory



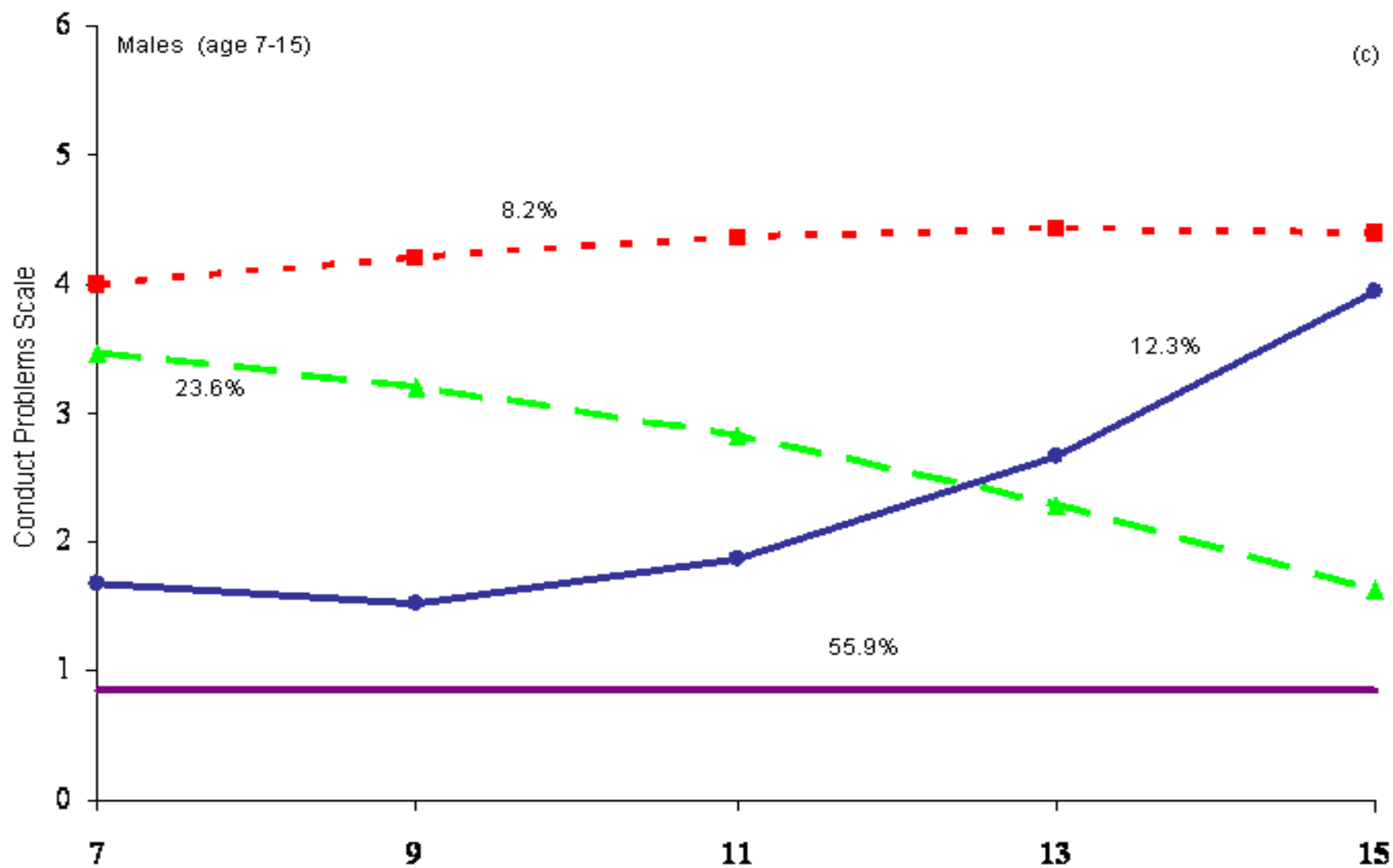
Measurement of Antisocial Behaviours

Fighting, Bullying, Telling Lies,
Stealing, Truancy, Destroying
Property.

Ages 7, 9, 11, 13, 15

Teacher, Mother and Self-Reports

Trajectory analysis to age 15



LCP
AL

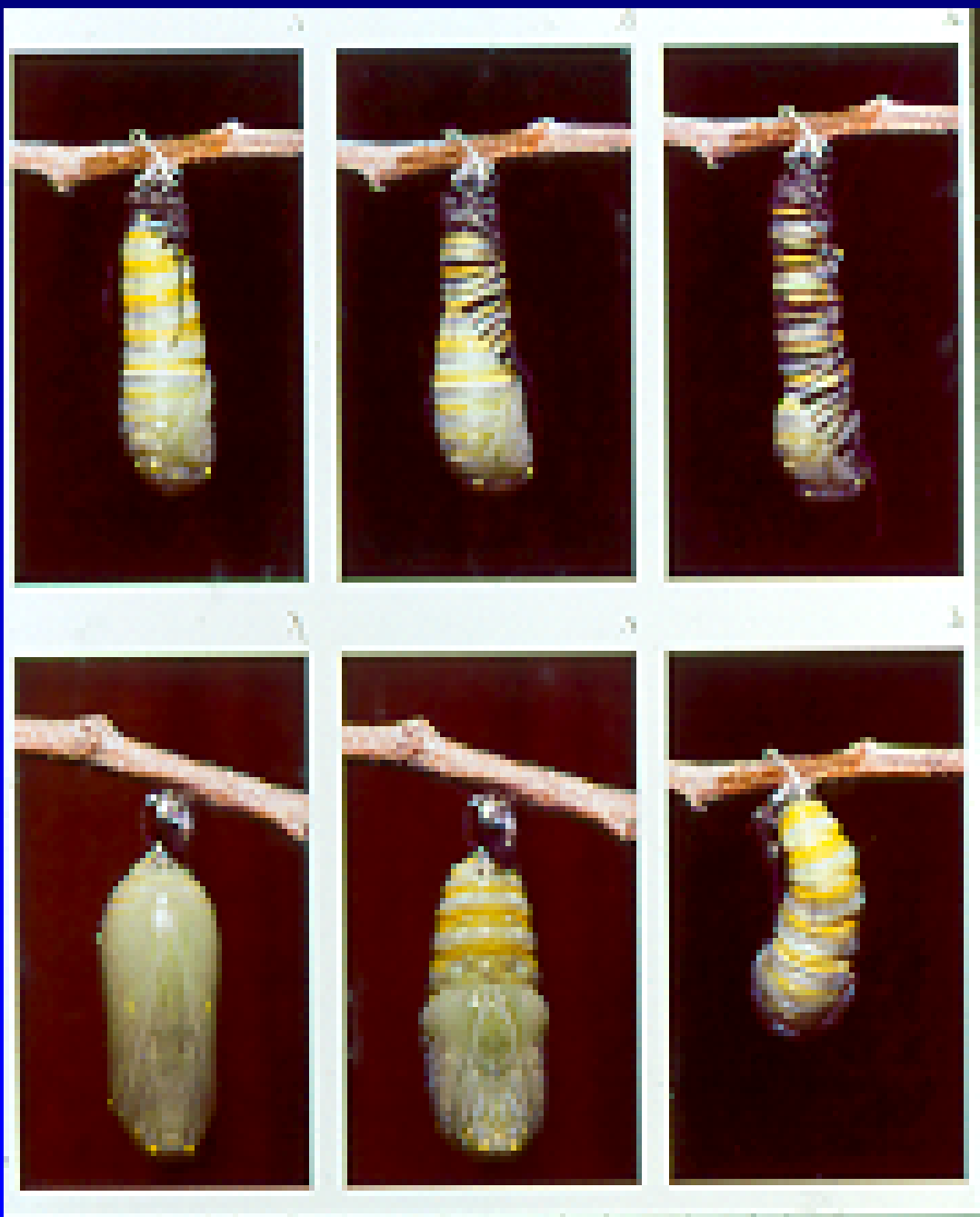
Recov

Low



Admiral

Monarch

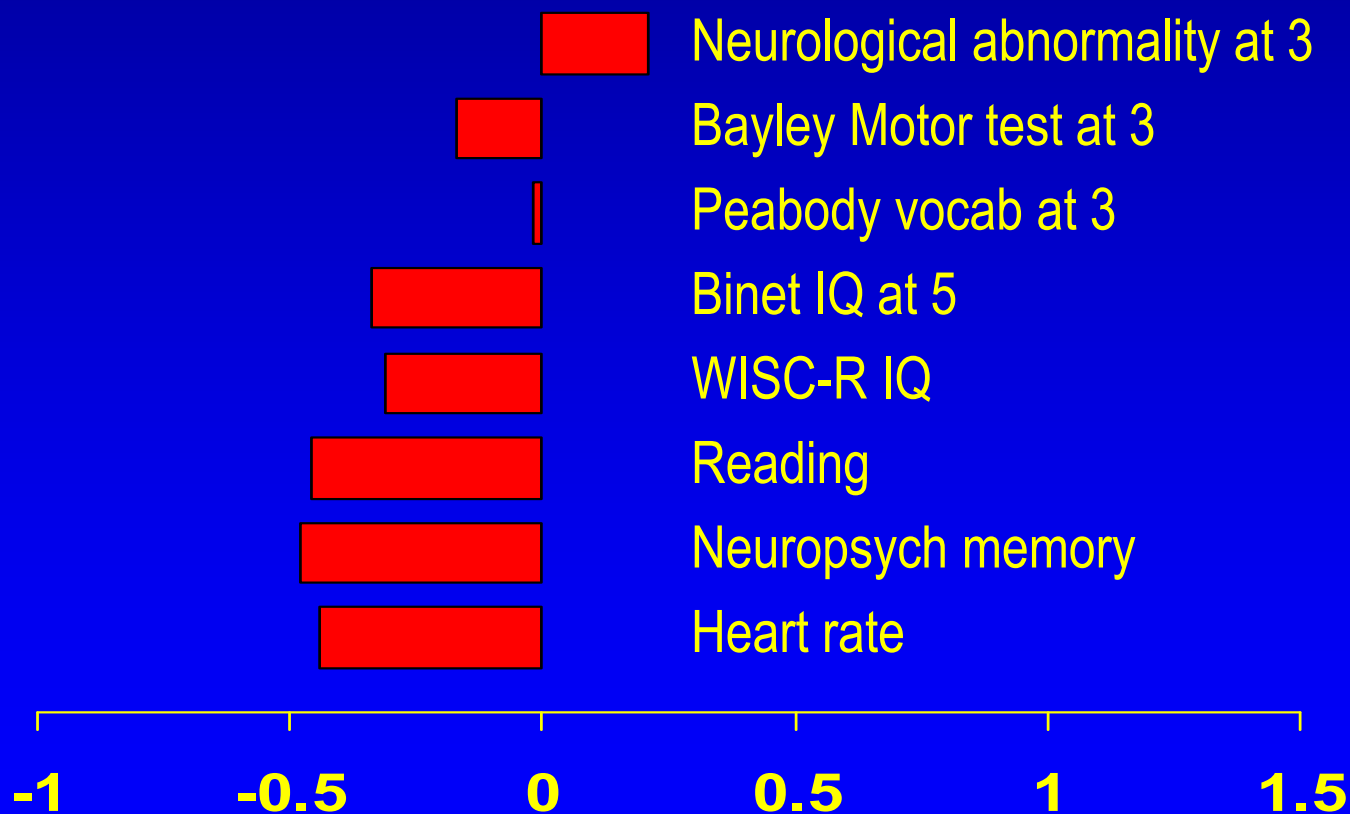


Studying childhoods of boys on the LCP and AL paths

- Graphs scaled so the population norm is the zero midpoint
- Compared each trajectory group to the average boy
- Effect sizes for group differences shown on graphs
 - $\sim .2$ = small
 - $\sim .5$ = medium
 - $\sim .8$ = a large

LCP-path males

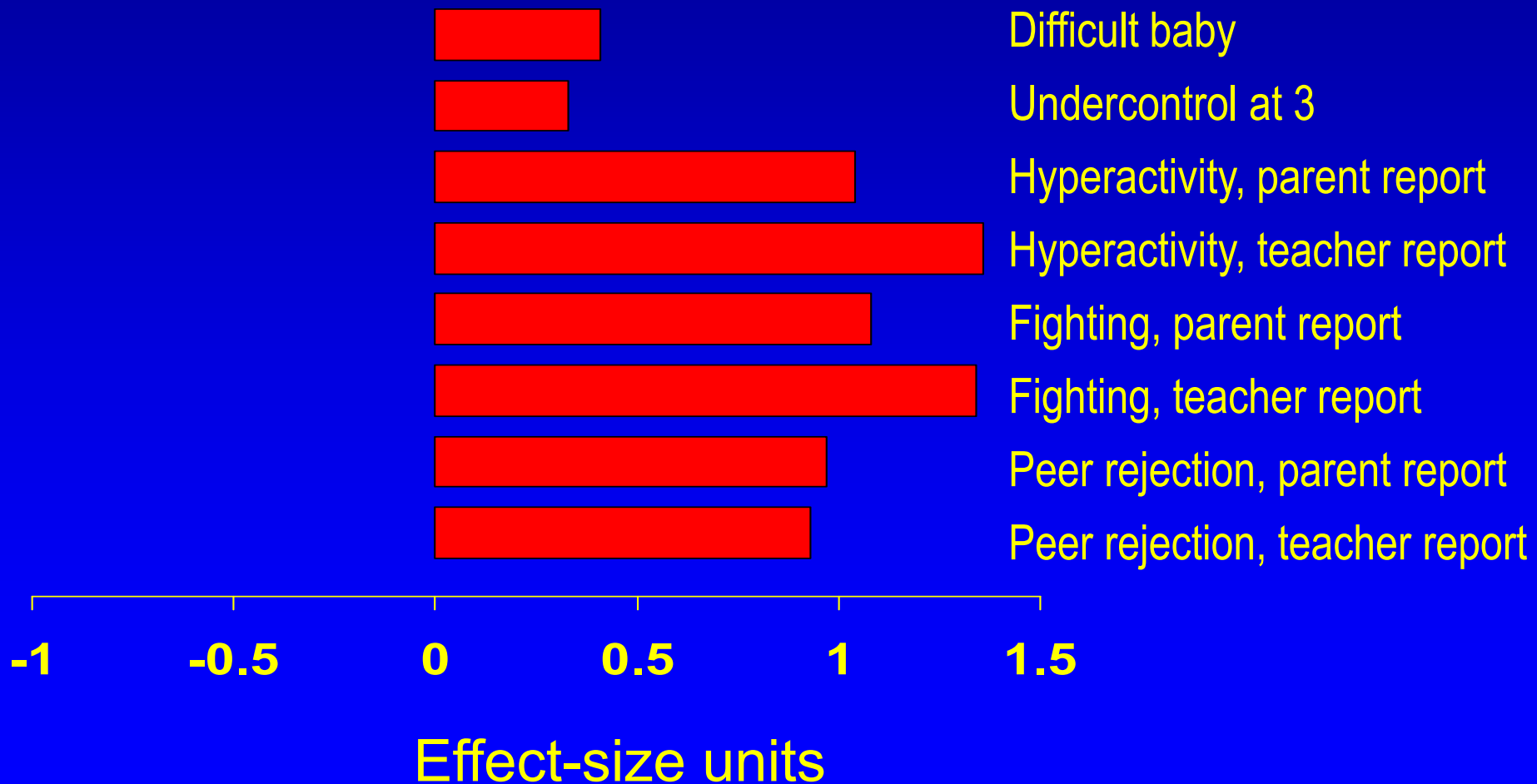
Neuro-developmental risks, age 3-11



Effect-size units, zero = the average boy

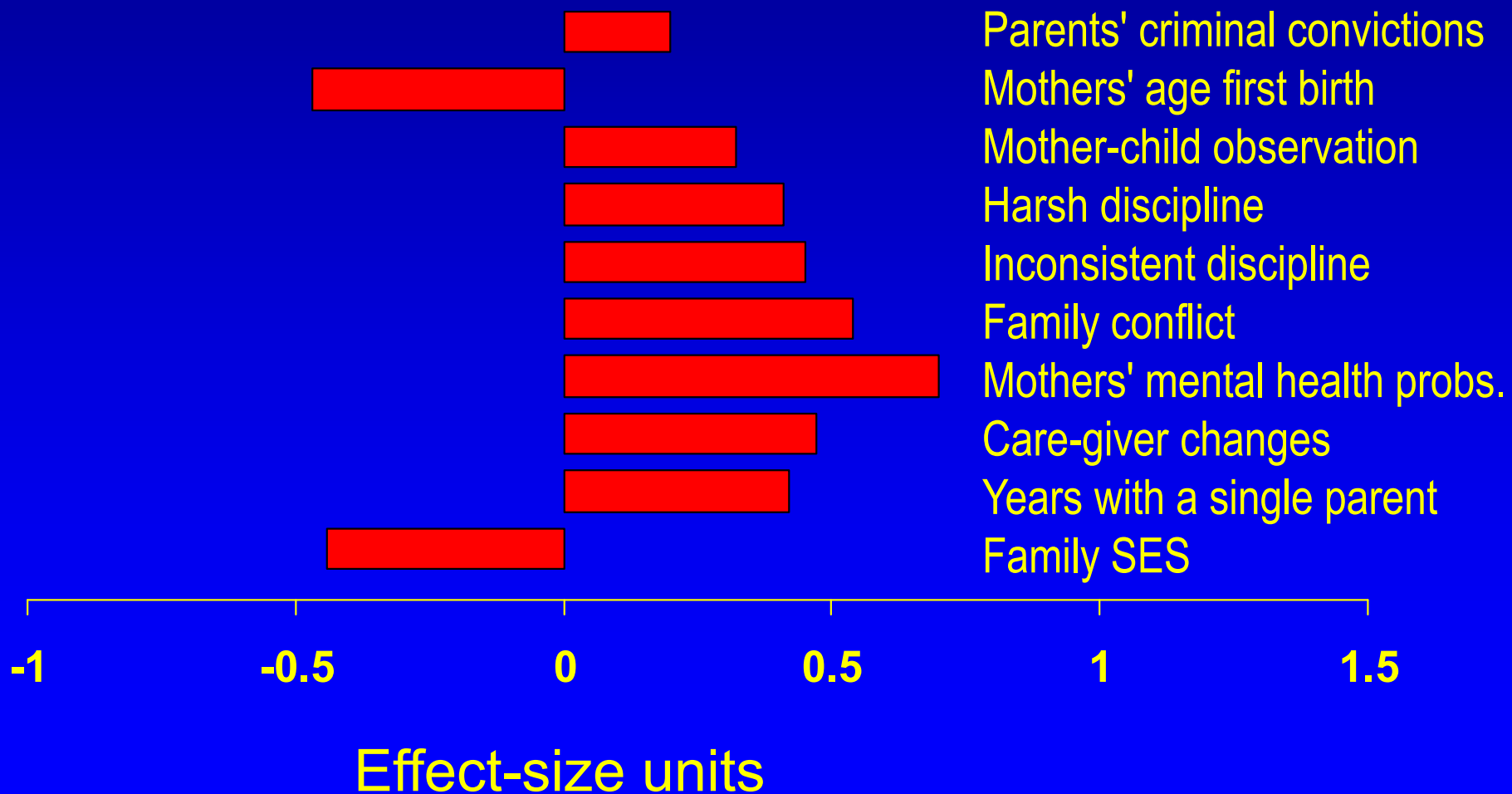
LCP-path males

Temperament-Behaviour Risks, age 3-11



LCP-path males

Parenting Risk Factors, age 3-11



SUMMARY: childhood of males on LCP path

PARENTING RISK FACTORS

Parents' criminal convictions
 Mothers' age first birth
 Mother-child observation
 Harsh discipline
 Inconsistent discipline
 Family conflict
 Mothers' mental health probs.
 Care-giver changes
 Years with a single parent
 Family SES

NEURO-COGNITIVE RISK

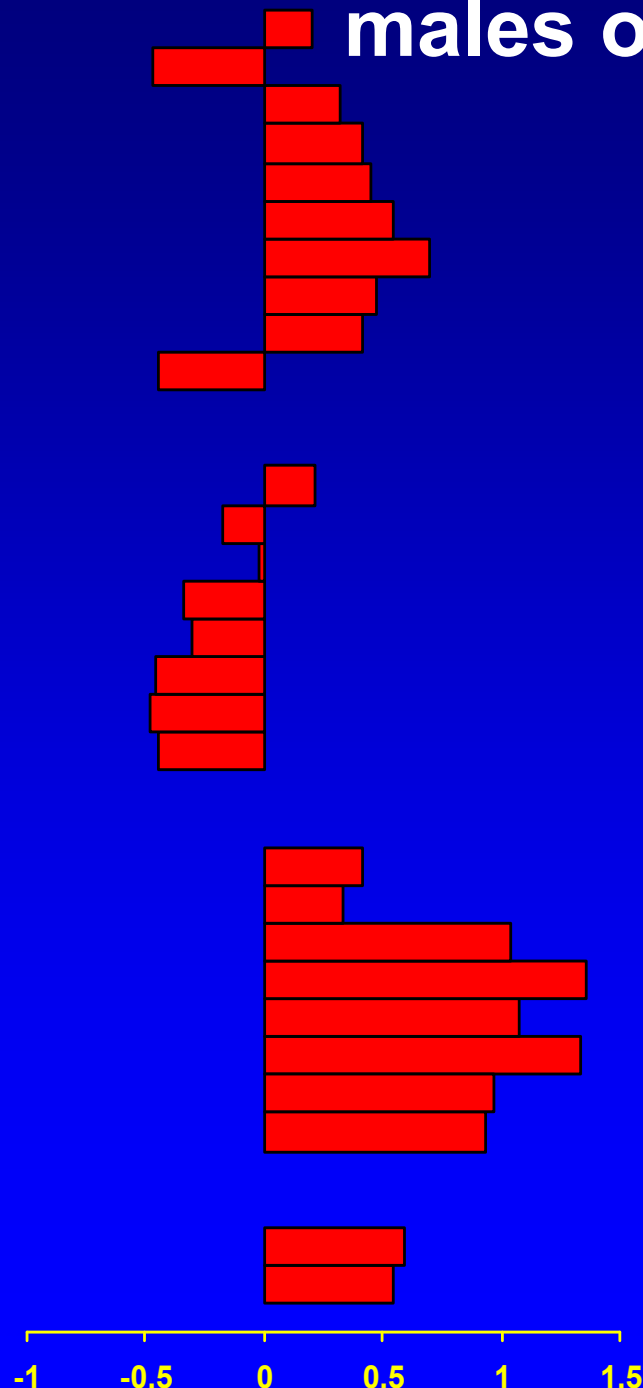
Neurological abnormality at 3
 Bayley Motor test at 3
 Peabody vocab at 3
 Binet IQ at 5
 WISC-R IQ
 Reading
 Neuropsych memory
 Heart rate

TEMPERAMENT - BEHAVIOUR RISK

Difficult at 2
 Undercontrol at 3
 Hyperactivity, parent report
 Hyperactivity, teacher report
 Fighting, parent report
 Fighting, teacher report
 Peer rejection, parent report
 Peer rejection, teacher report

PEER DELINQUENCY

Delinquent peers at 13
 Delinquent peers at 18



*Moffitt et al., 2001,
 Dev & Psychopathology*

SUMMARY: childhood of males on AL path

PARENTING RISK FACTORS

Parents' criminal convictions
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 Mother-child observation
 Harsh discipline
 Inconsistent discipline
 Family conflict
 Mothers' mental health probs.
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 Years with a single parent
 Family SES

NEURO-COGNITIVE RISK

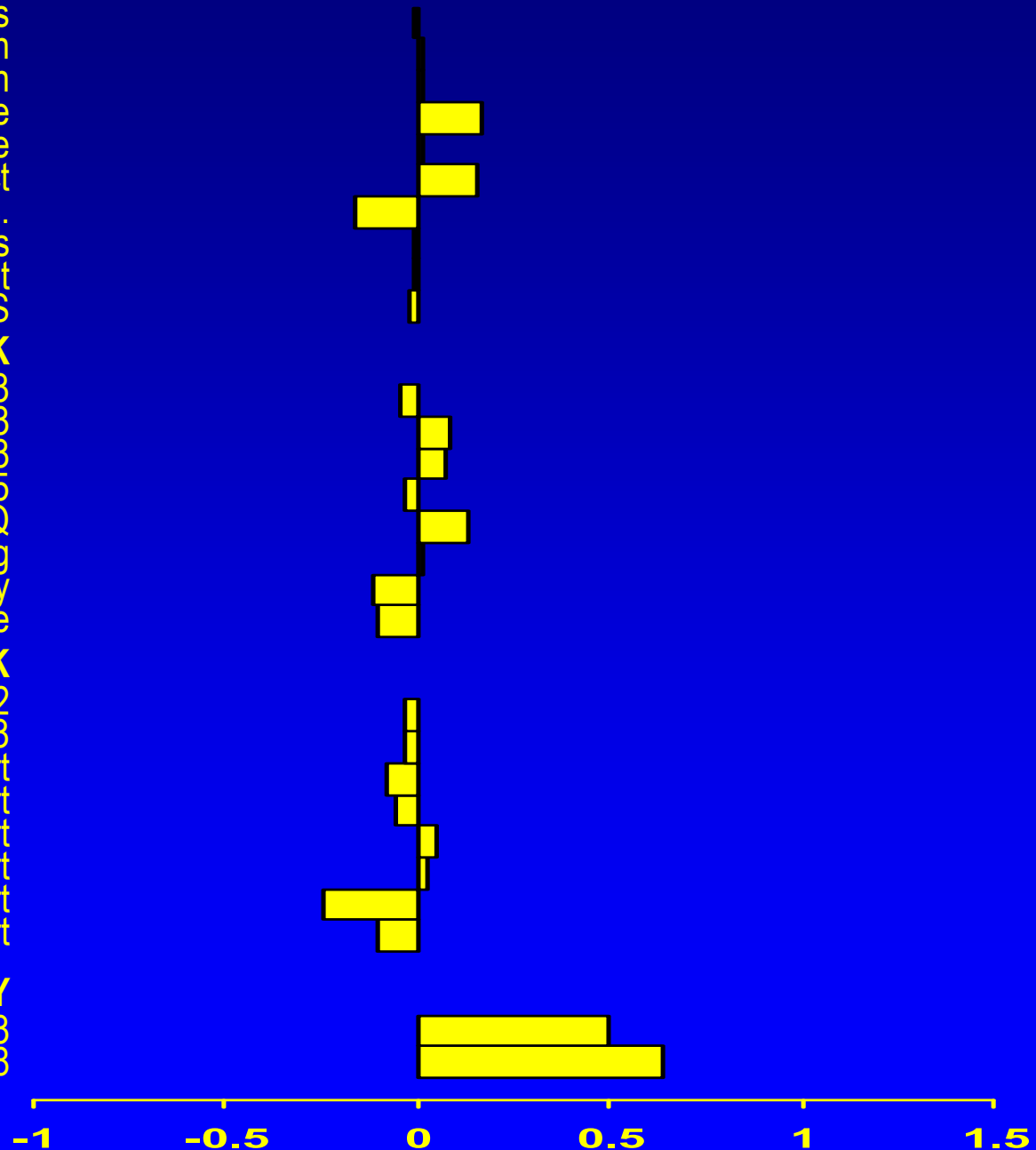
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 Bayley Motor test at 3
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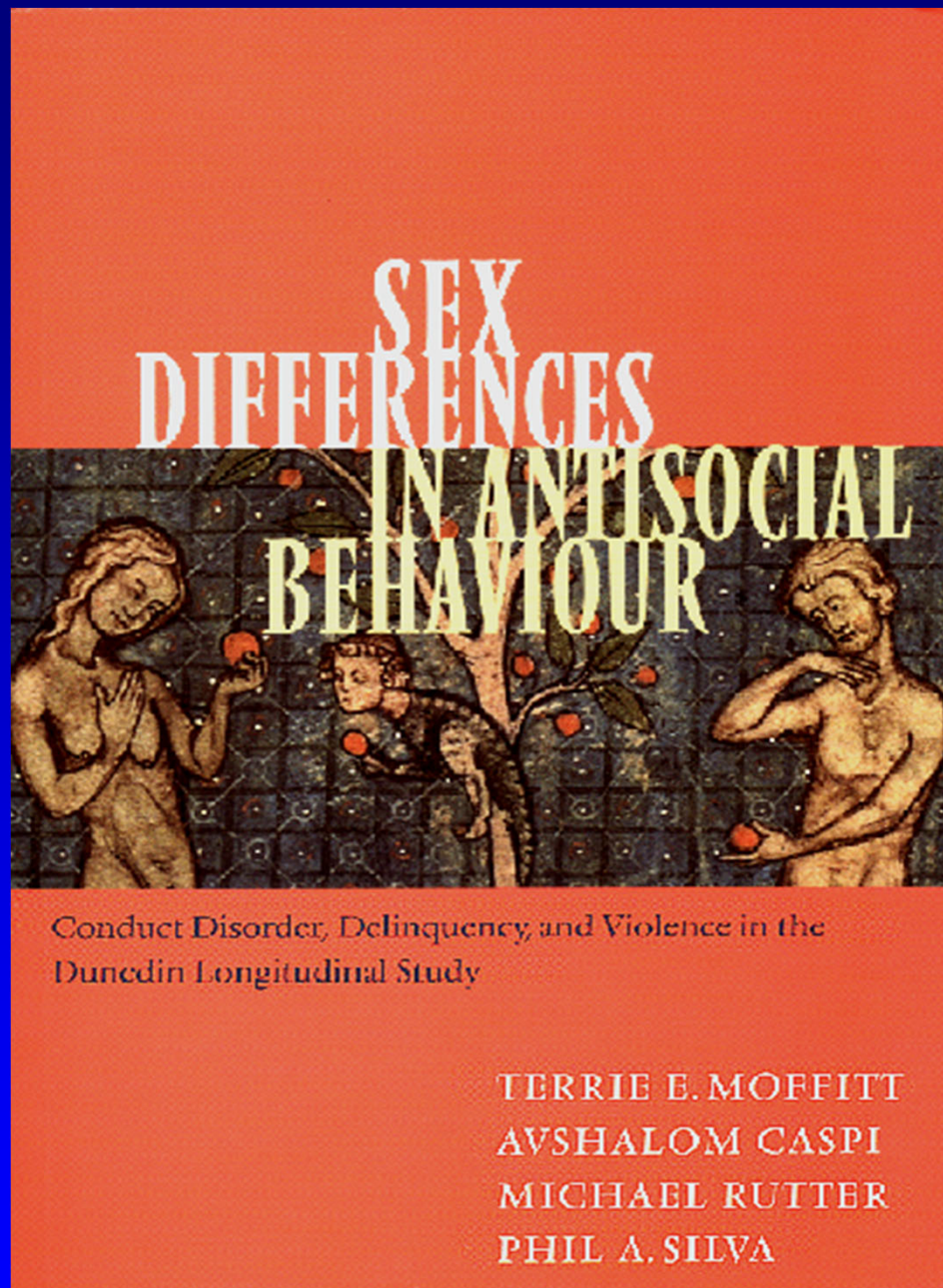
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 Peer rejection, teacher report

PEER DELIQUENCY

Delinquent peers at 13
 Delinquent peers at 18





Life-course
persistent:
More common
in males

Adolescence-
Limited:
Equal male:female
ratio

Cambridge Univ. Press, 2001

Childhood of the few girls on the LCP path

PARENTING RISK FACTORS

Parents' criminal convictions
 Mothers' age first birth
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 Harsh discipline
 Inconsistent discipline
 Family conflict
 Mothers' mental health probs.
 Care-giver changes
 Years with a single parent
 Family SES

NEURO-COGNITIVE RISK

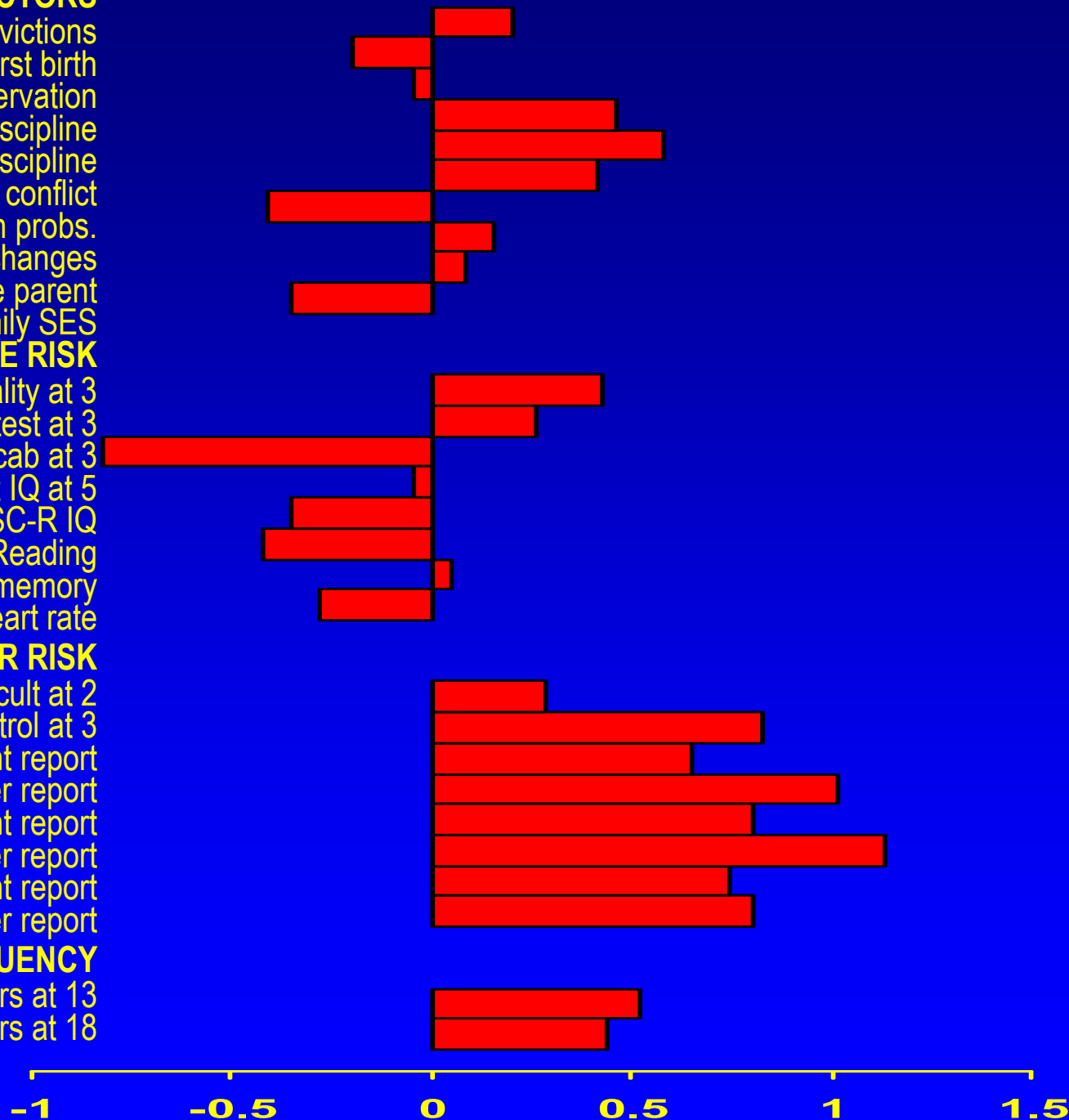
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 Hyperactivity, teacher report
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PEER DELIQUENCY

Delinquent peers at 13
 Delinquent peers at 18



Childhood of girls, most on the AL path

PARENTING RISK FACTORS

Parents' criminal convictions
Mothers' age first birth
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Inconsistent discipline
Family conflict
Mothers' mental health probs.
Care-giver changes
Years with a single parent
Family SES

NEURO-COGNITIVE RISK

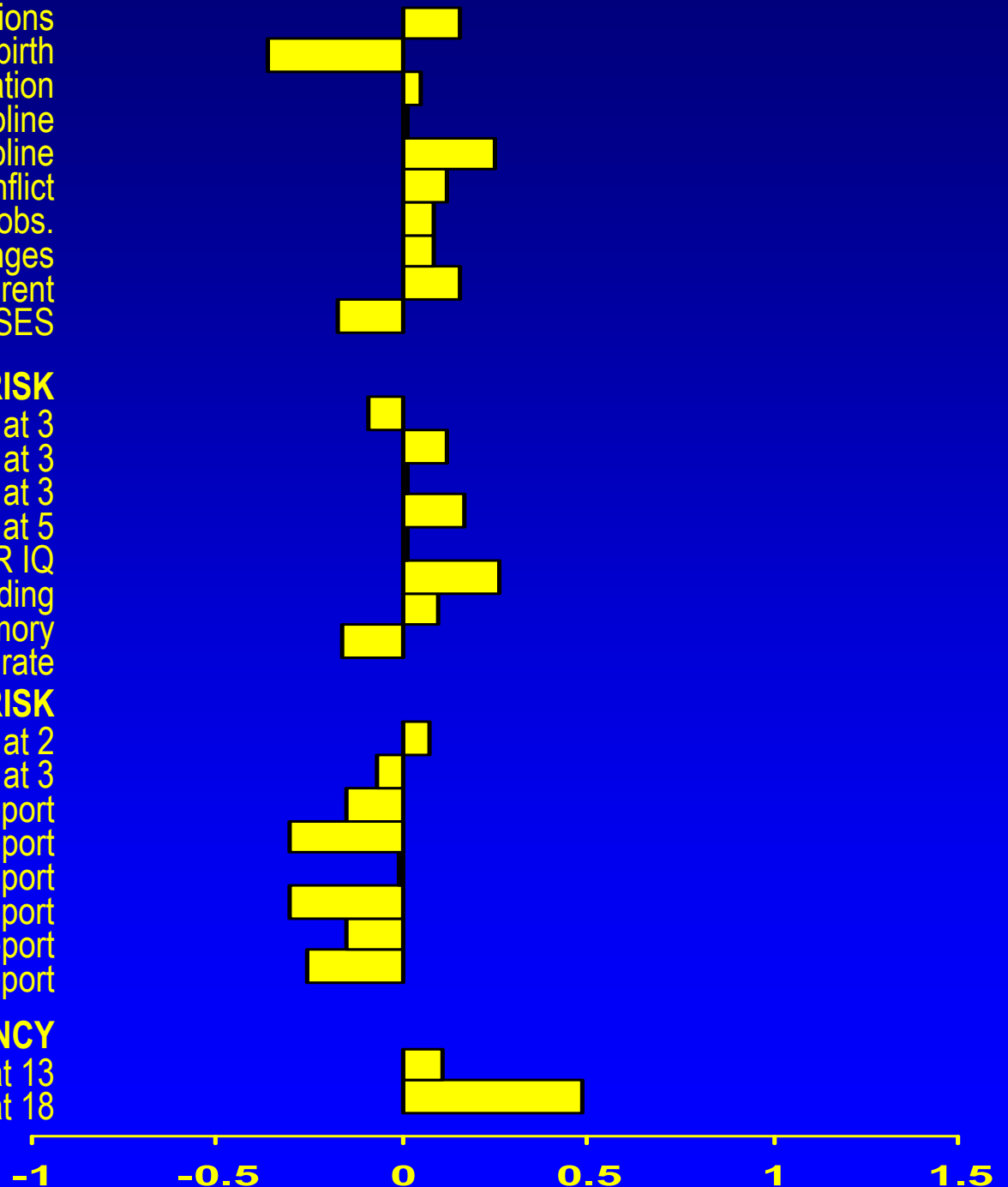
Neurological abnormality at 3
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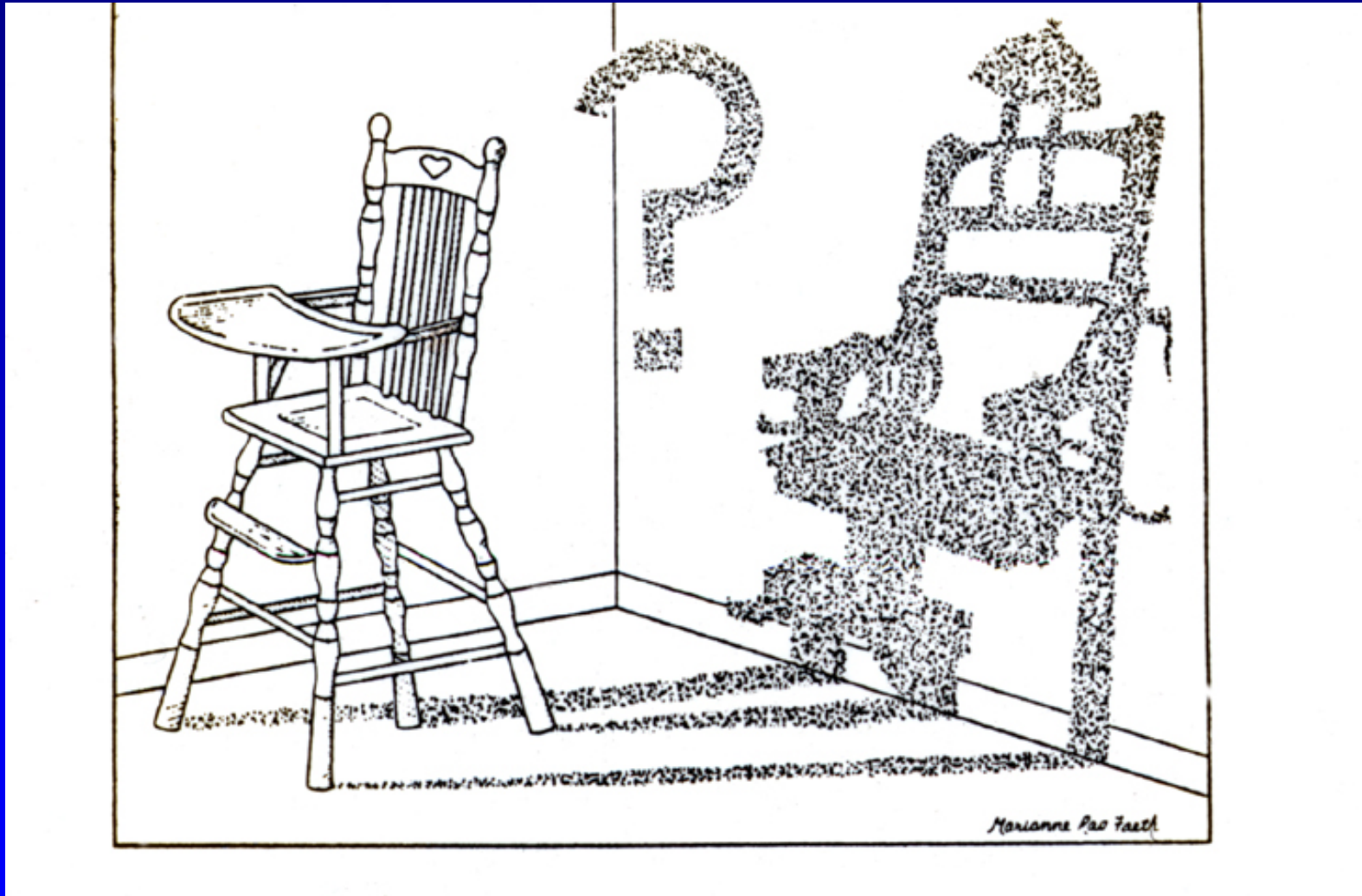
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PEER DELIQUENCY

Delinquent peers at 13
Delinquent peers at 18



Do LCP & AL have different adult outcomes?



Washington Post, 1994

Dunedin Study Design

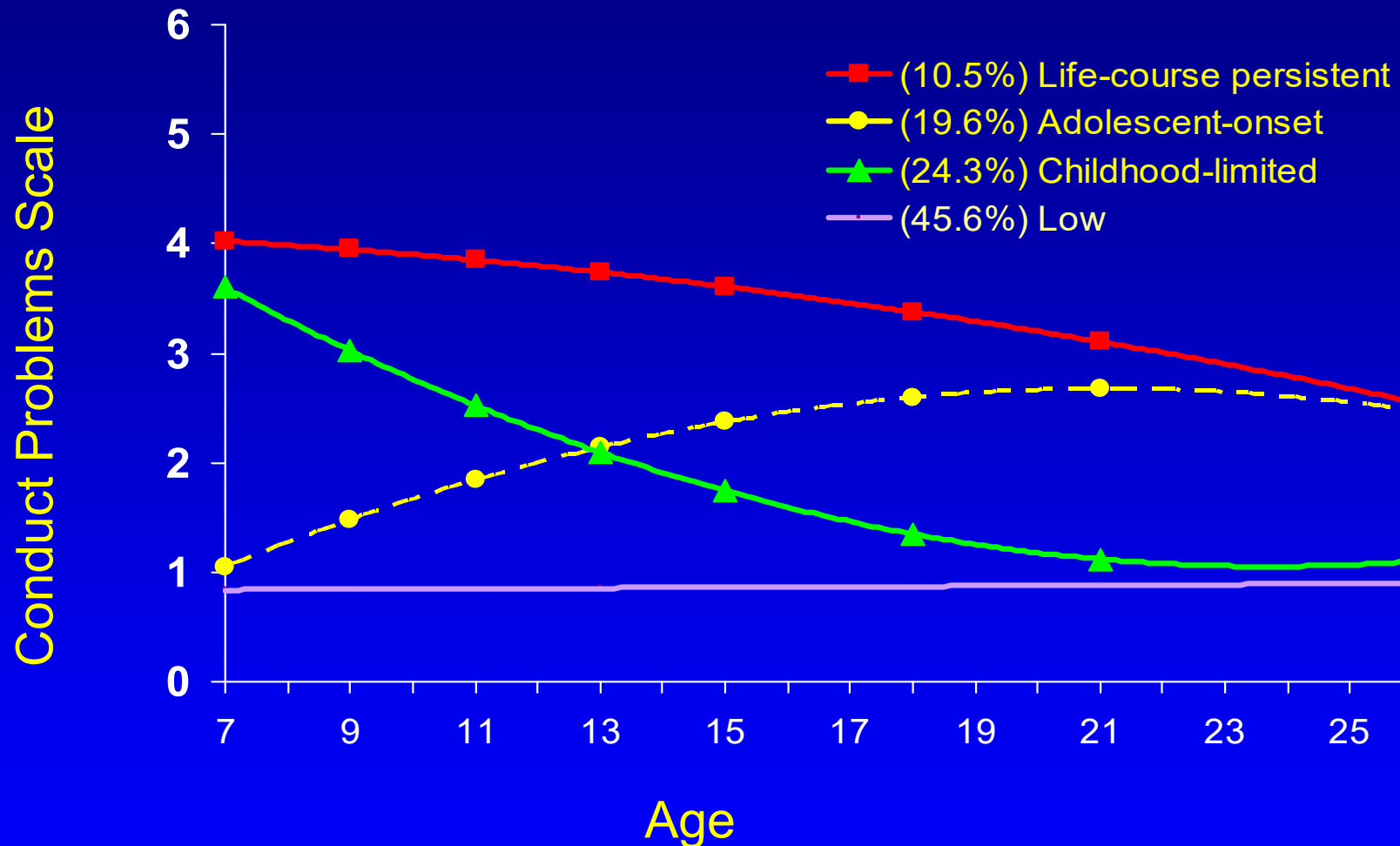
Age 18,
21, 26

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Candice Odgers, UC Irvine

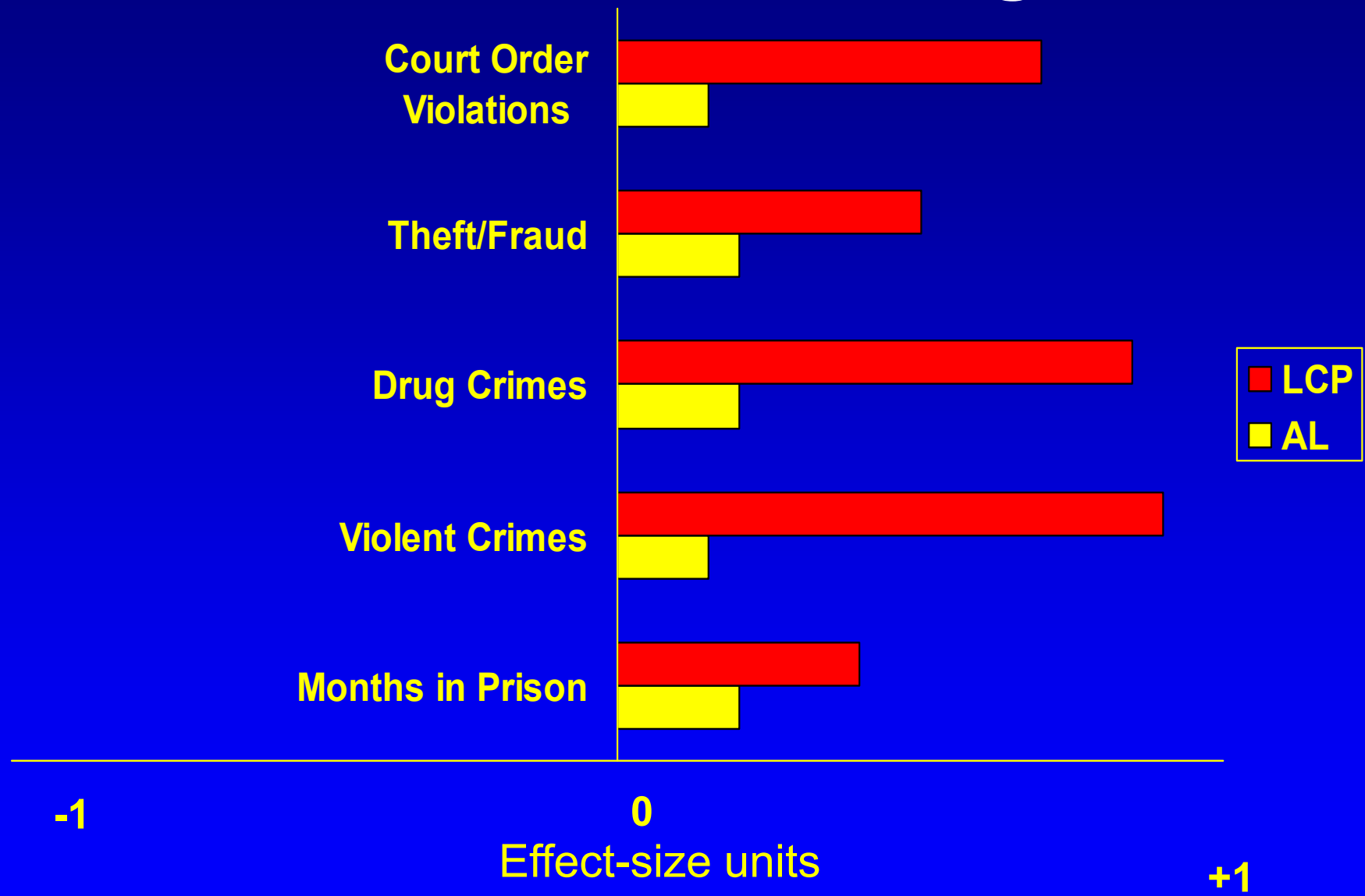


Trajectories age 7 to 26 (males and females)

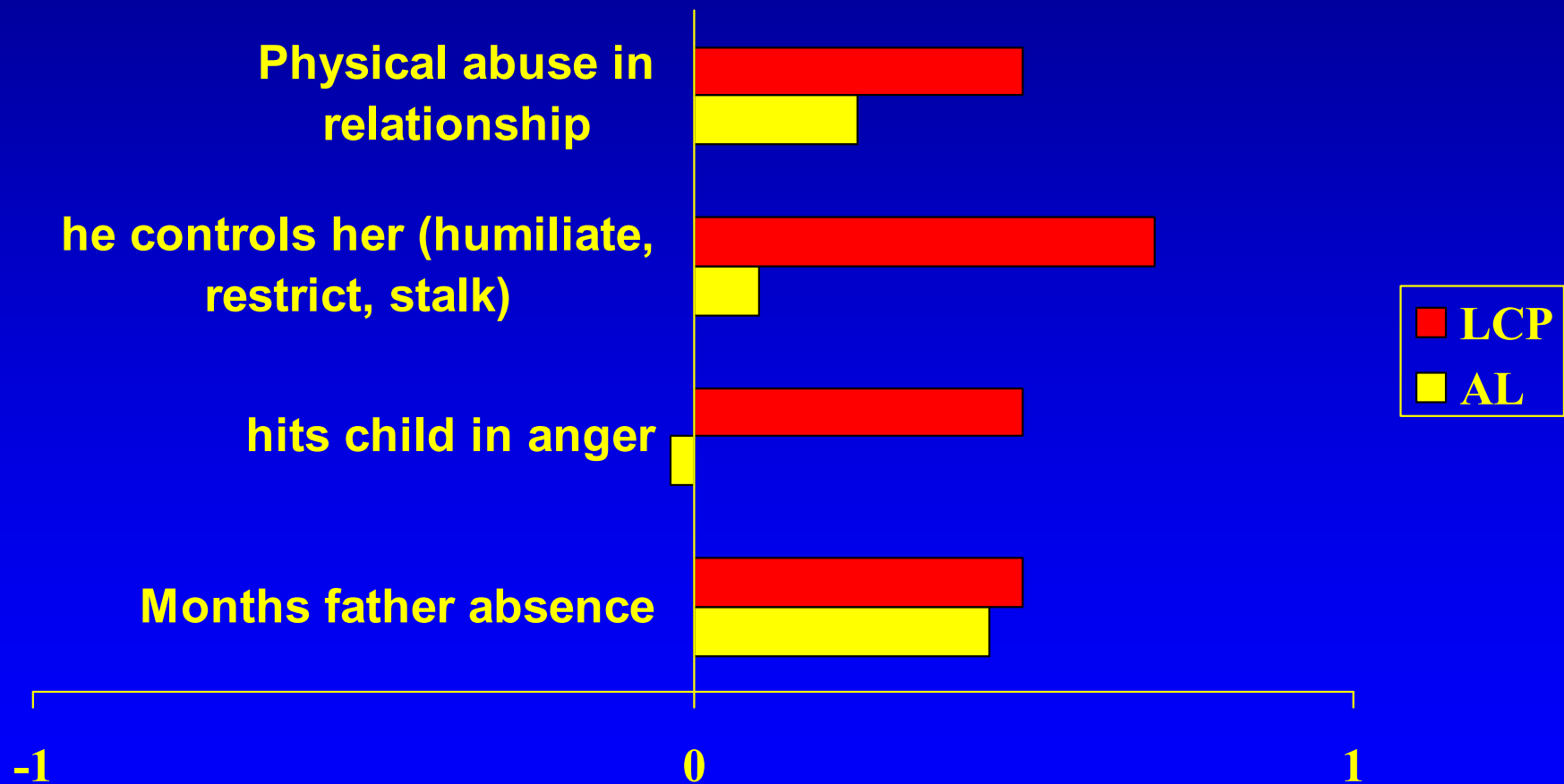


Odgers, Moffitt, Caspi, D&P, 2008

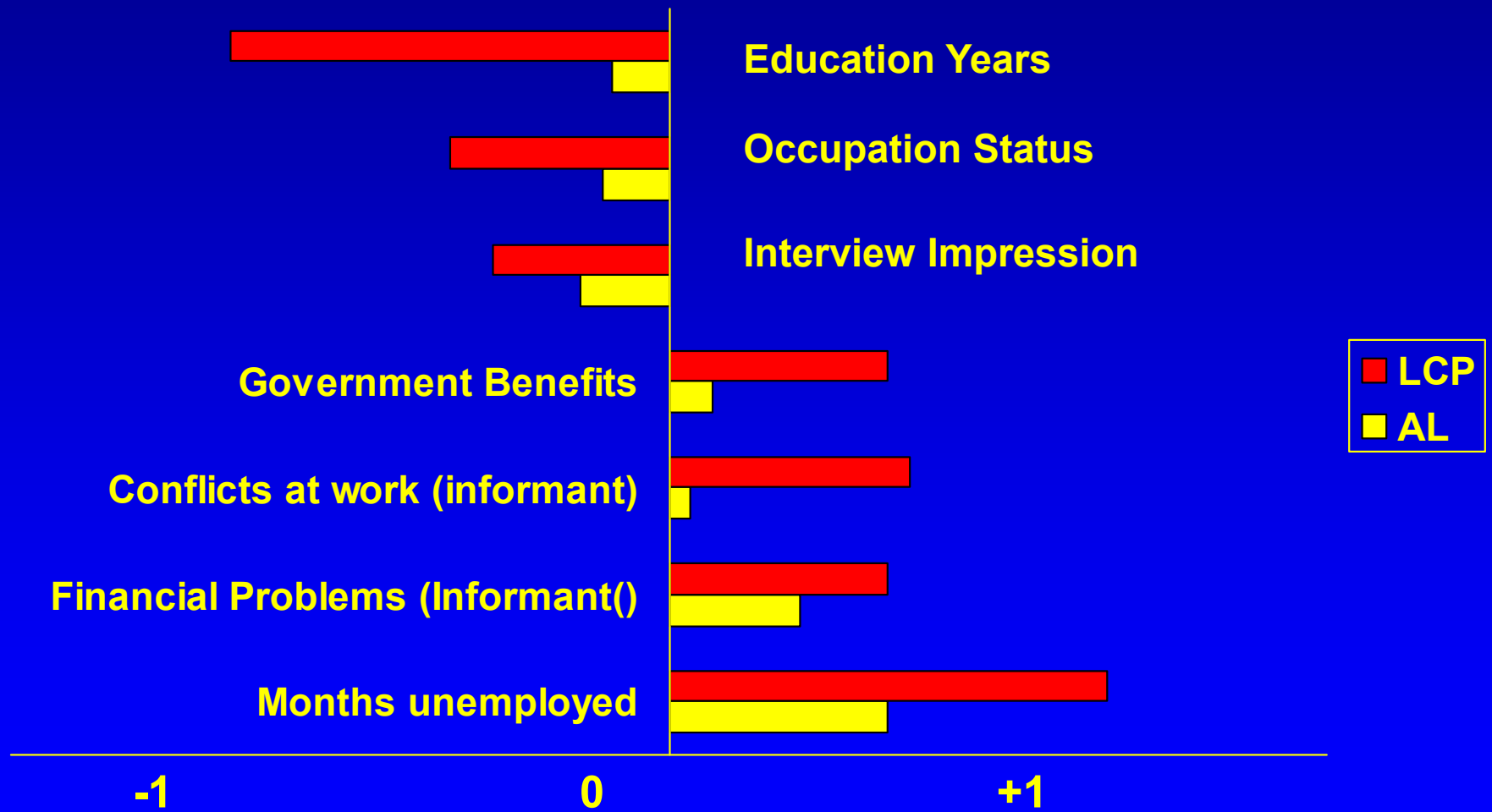
Convictions in adult court age 18-26



Family problems at age 26



Work problems at age 26



**Conduct-problem boys who did not
become offenders:
Magic key to protective factors?**

- Were they really recoveries?

The childhood-limited group's adult outcomes...

- Social phobia
- Agoraphobia
- No partner
- No children
- Neuroticism
- Introversion
- Welfare dependent
- Low education
- Lowest SES jobs
- Financial difficulties
- 1/3 convicted

Childhood-limited conduct disorder: not a key to protective factors

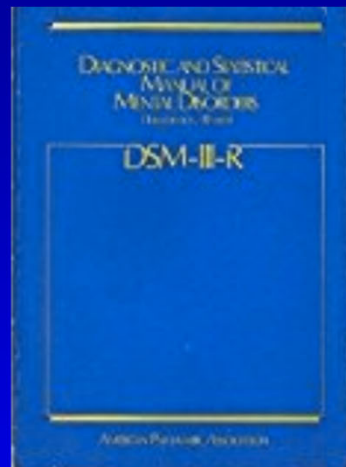
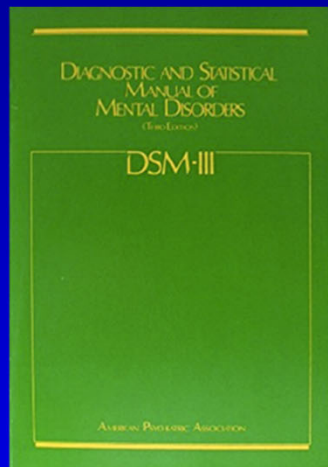
Lee Robins, *Deviant Children Grown Up* (1966):

“Half of boys with conduct disorder do not develop antisocial personality disorder as adults....
but most of them develop other adjustment problems.”

David Farrington et al. (1988):

“...there were no real adult success stories.”

American Psychiatric Association Diagnostic and Statistical Manual



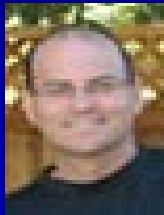
1994

Clinician's dilemma: Childhood-limited or Life-course Persistent?



2006 Dunedin Family Health History Study:

Informants



Study member



Father



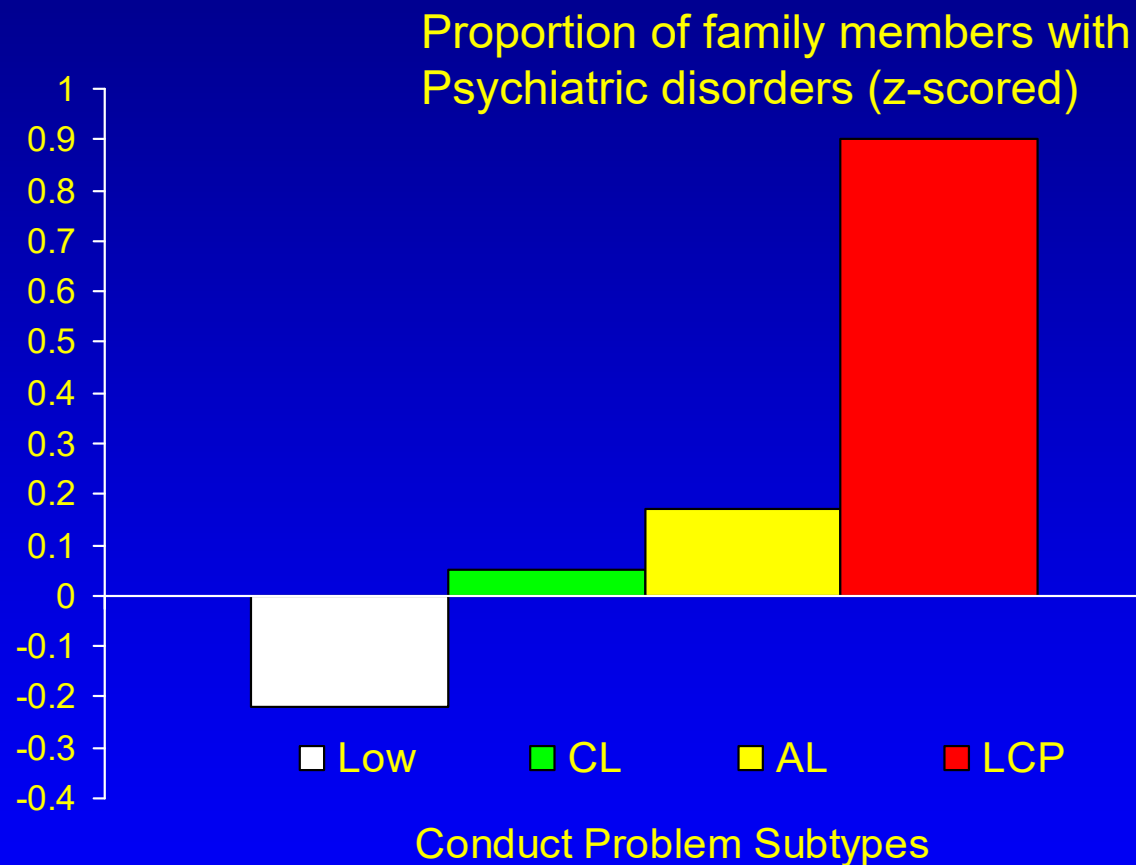
Mother

Family members



7-16 members per each of 1000 families,
> 8,000 individuals

Family psychiatric history distinguished children on the life-course-persistent path

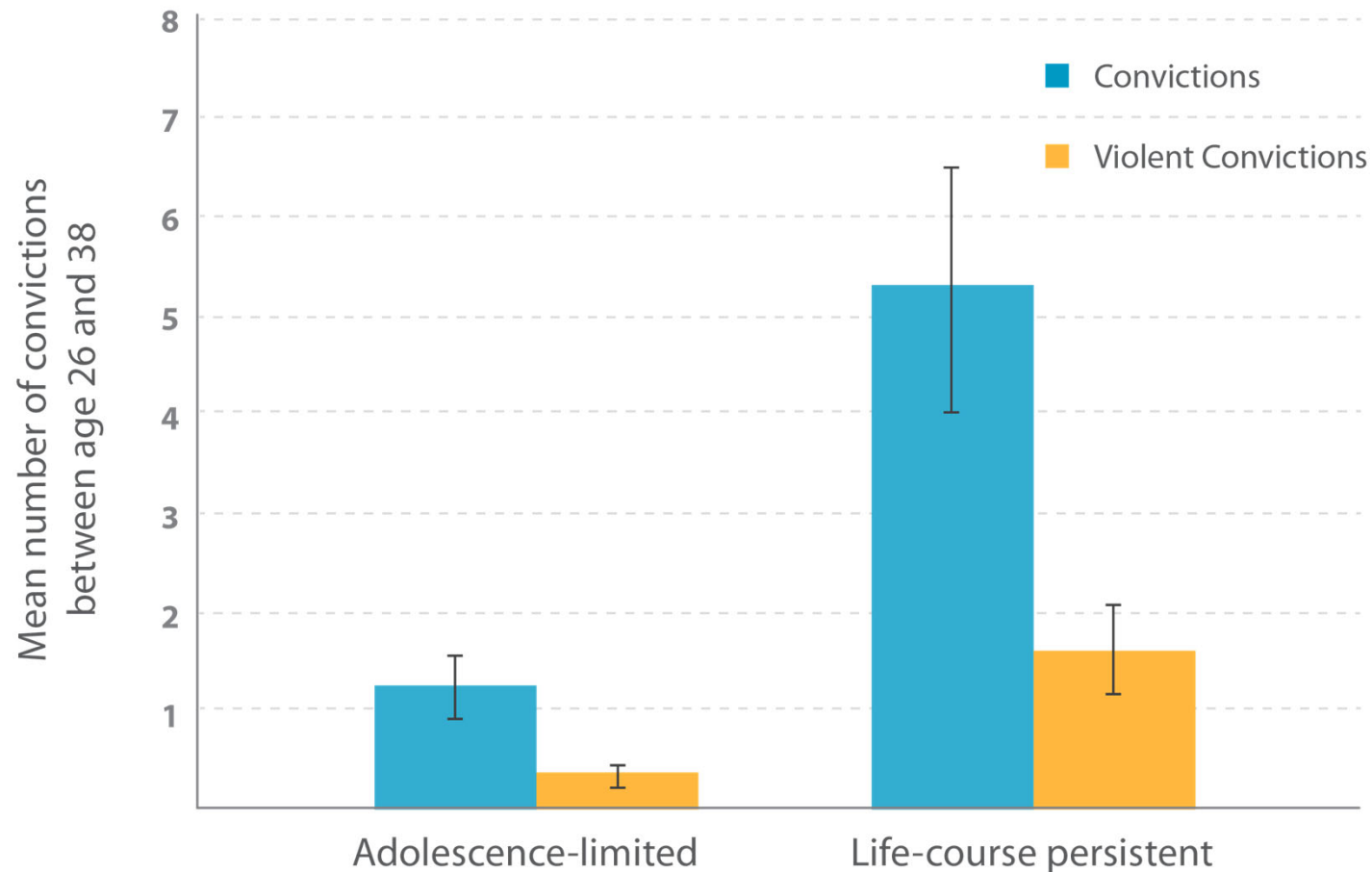


Dunedin Study Design

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**Ages 32,
38, 45**

After age 26, Adolescence-limited & Life-course persistent have continued to diverge on criminal convictions.



Moffitt, 2018, Nature Human Behaviour

Biology and Crime: A heated debate

- Neurodevelopmental hypothesis in 1993
- But technology not available to test
- New data technologies 3 decades later
- Genome-wide genetics
- MRI Brain imaging

Genetics and Crime: Integrating New Genomic Discoveries Into Psychological Research About Antisocial Behavior

Psychological Science
2018, Vol. 29(5) 791–803
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sagepub.com/journalsPermissions.nav
DOI: 10.1177/0956797617744542
www.psychologicalscience.org/PS

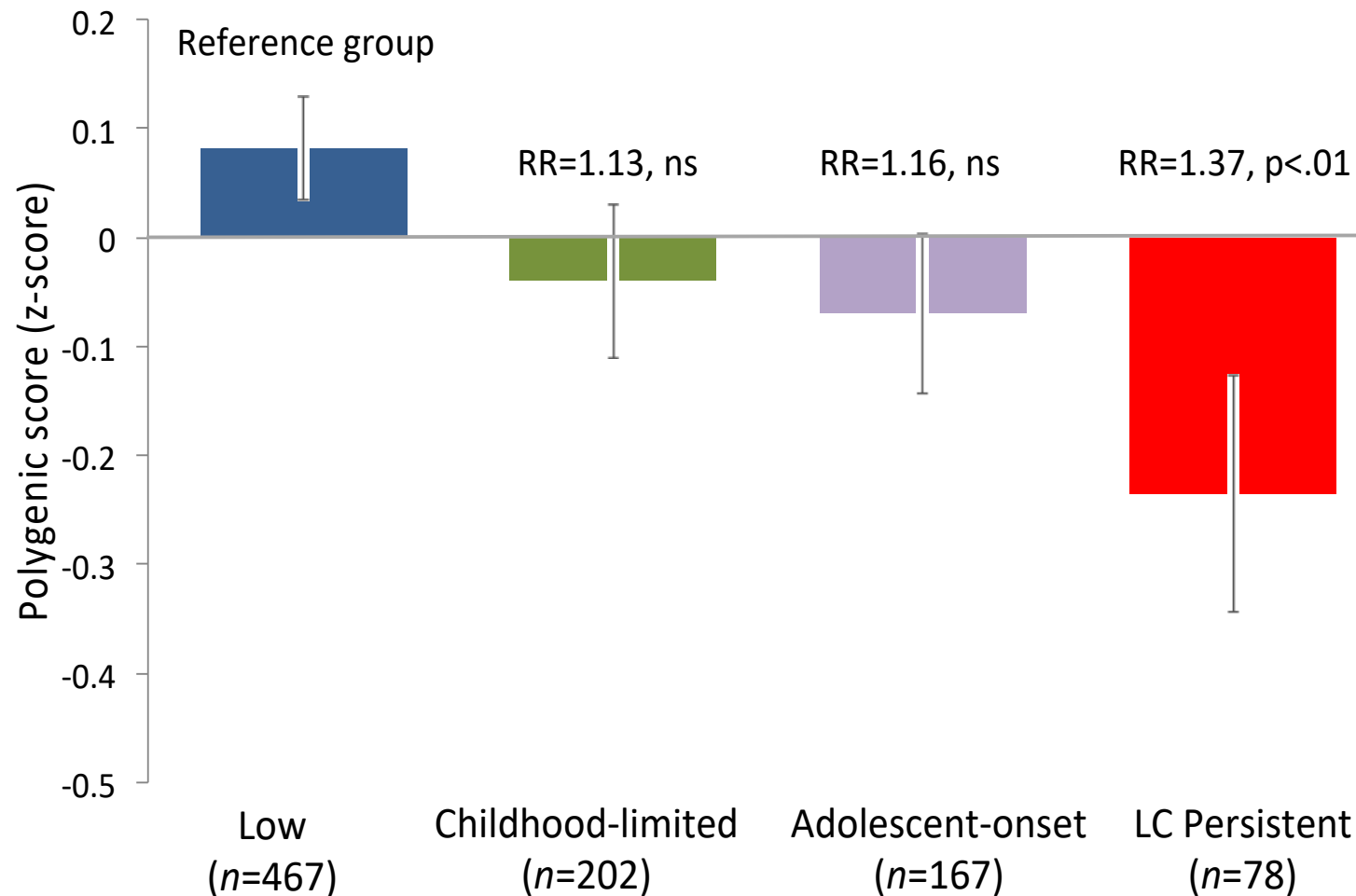

**J. Wertz¹, A. Caspi^{1,2,3,4}, D. W. Belsky^{5,6}, A. L. Beckley^{1,7},
L. Arseneault⁴, J. C. Barnes⁸, D. L. Corcoran³, S. Hogan⁹,
R. M. Houts¹, N. Morgan¹⁰, C. L. Odgers¹¹, J. A. Prinz³, K. Sugden¹,
B. S. Williams¹, R. Poulton⁹, and T. E. Moffitt^{1,2,3,4}**

¹Department of Psychology & Neuroscience, Duke University; ²Department of Psychiatry & Behavioral Sciences, Duke University School of Medicine; ³Center for Genomic and Computational Biology, Duke University; ⁴Social, Genetic, & Developmental Psychiatry Research Centre, Institute of Psychiatry, Psychology, & Neuroscience, King's College London; ⁵Department of Medicine, Duke University School of Medicine; ⁶Social Science Research Institute, Duke University; ⁷Demography Unit, Department of Sociology, Stockholm University; ⁸School of Criminal Justice, University of Cincinnati; ⁹Dunedin Multidisciplinary Health and Development Research Unit, Department of Psychology, University of Otago; ¹⁰Home Office, London, United Kingdom; and ¹¹Sanford School of Public Policy, Duke University

What is the education polygenic score?

- 1 million people provided their DNA
- Stated their level of education
- GWAS: whole genome is searched for markers that associate with levels of education, low to high
- Genetic markers summed to create the polygenic score for educational attainment
- Score taps intelligence, also self-control, attention
- We derived this score in each Dunedin Study member's DNA

Mean Educational Attainment polygenic score
derived from GWAS of >1million,
for Dunedin Study crime trajectory groups:

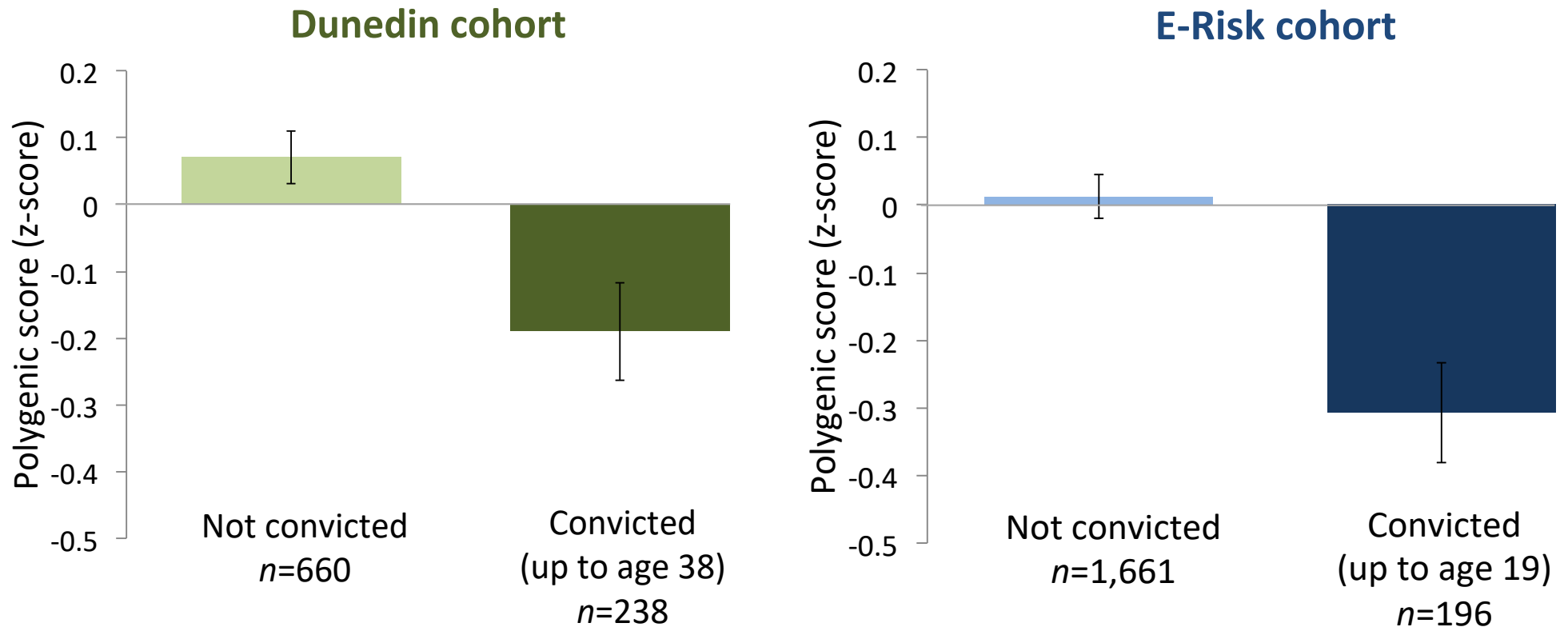






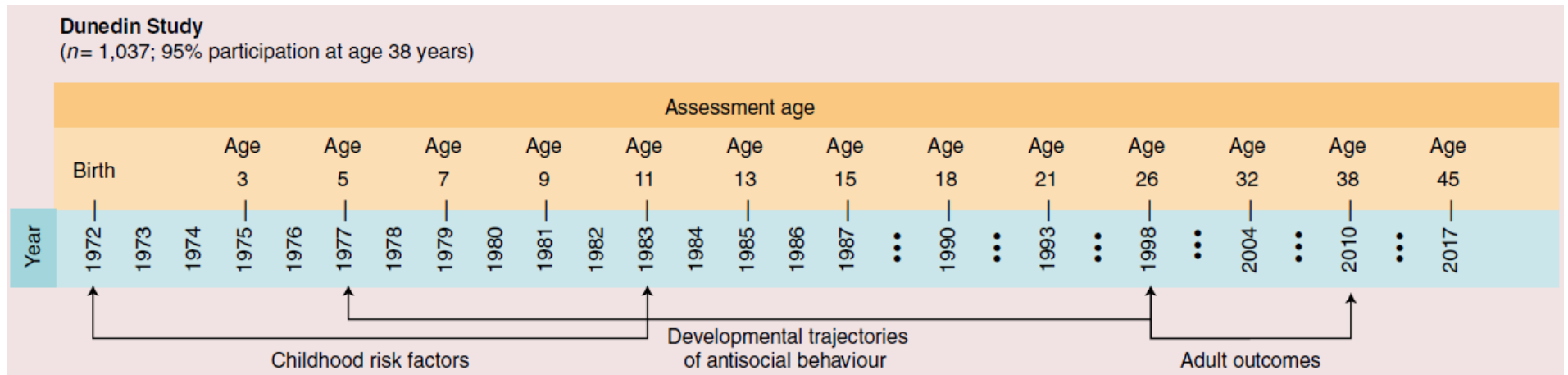
The Environmental Risk (E-Risk)
longitudinal study

Cross-cohort replication of mean education polygenic score by crime conviction



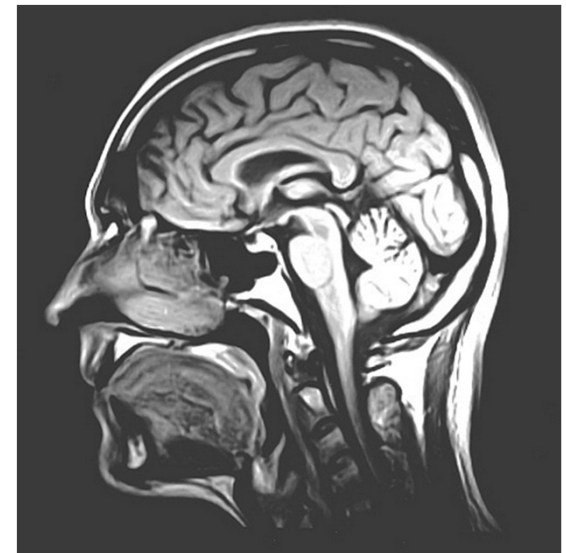
Wertz, Caspi, Moffitt, Psychological Science, 2018

Dunedin Study adds neuroimaging 2017-2019



Physical fighting
Bullying
Destroying property
Truancy
Stealing
Lying

MRI Brain scans



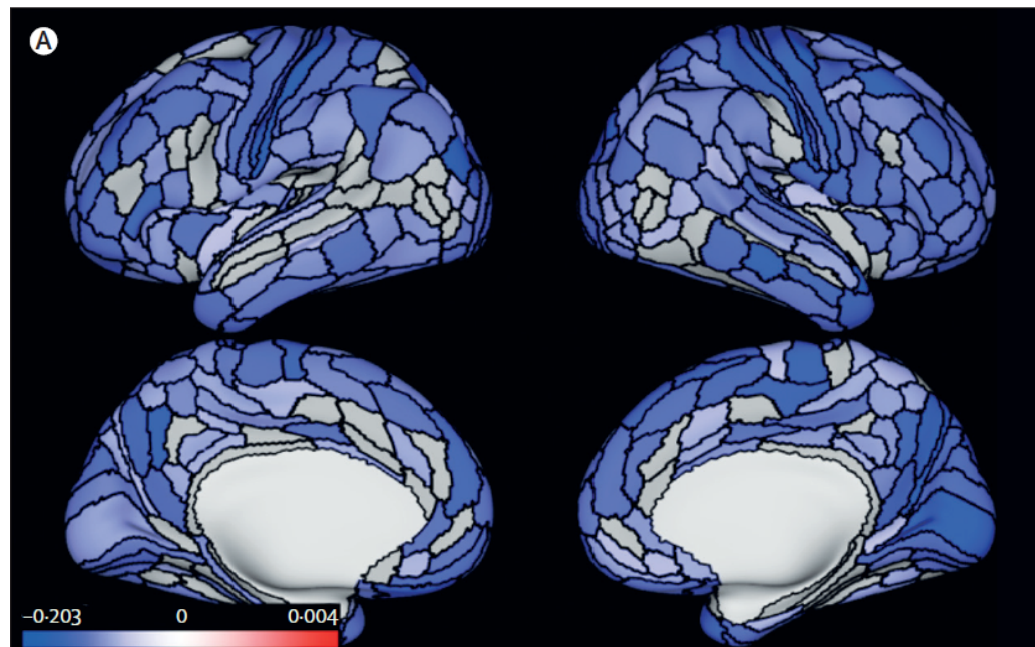
Brain's surface area at age 45

Blue = smaller surface
area



Darker = bigger *group* differences

Life-course persistent had smaller surface area than low-antisocial



Carlisi, Caspi, Moffitt, et al. 2020, *Lancet Psychiatry*

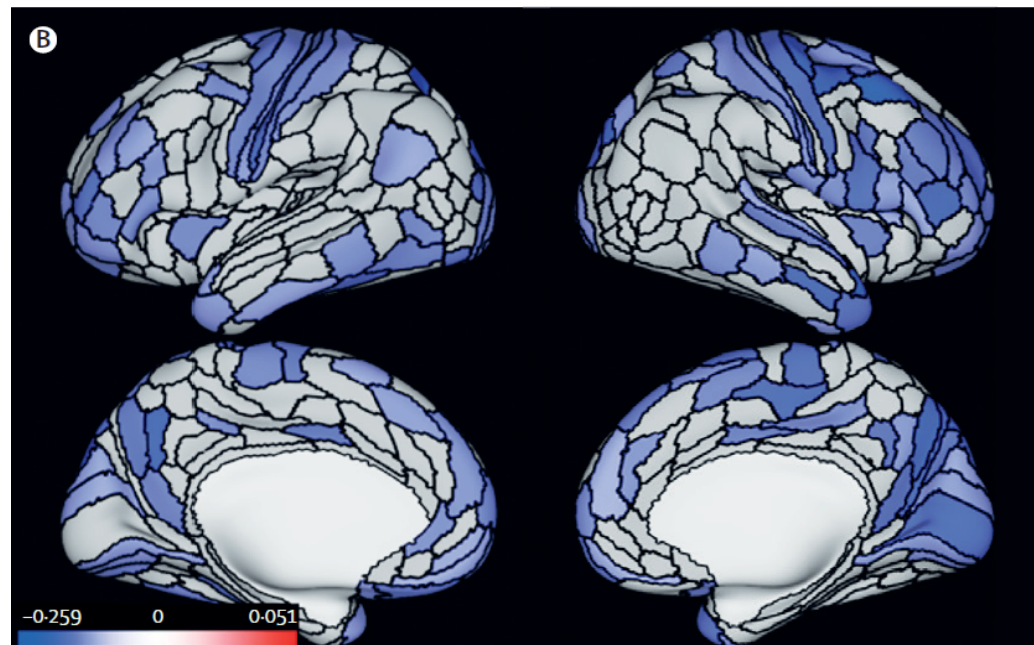
Brain's surface area at age 45

Blue = smaller surface area



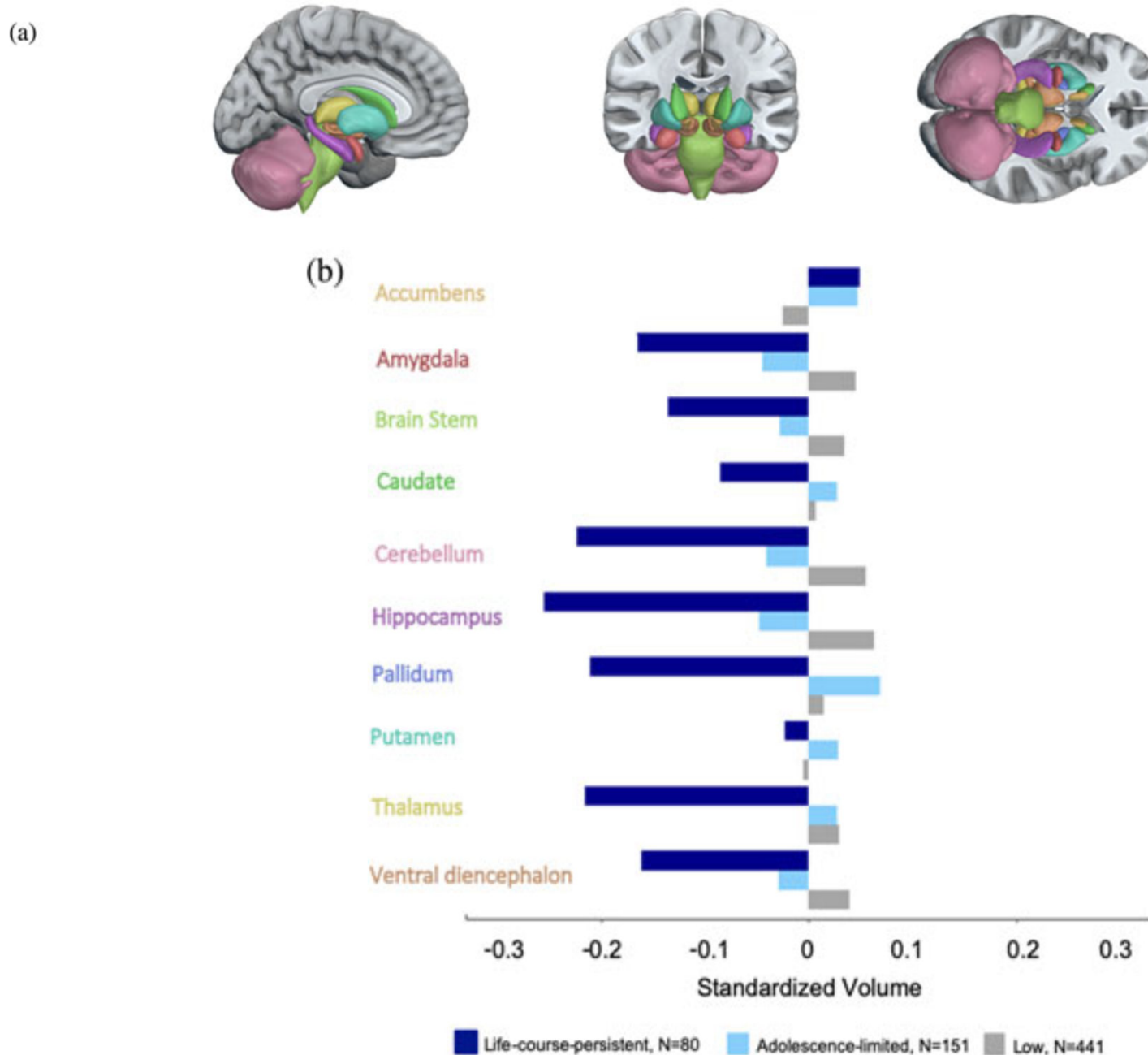
Darker = bigger *group* differences

Life-course persistent also had smaller surface area
than adolescence-limited



Adolescent-limited did not differ from low-antisocial group

Brain's subcortical gray-matter volumes were smaller in Life-course Persistent group



Genetics and Adult Brain Structure

- Only the small *minority* of offenders who showed antisocial behaviour throughout their lives, from childhood well into adulthood, had any differences in genetics or in brain structure.
- The *majority* of offenders who break the law as young people *do not*.

**LCP are doing less crime in midlife,
should we still worry about them?**

**An antisocial lifestyle may have
biological consequences**

Studying aging outcomes....

Control for history of tobacco smoking.

Control for health measures in childhood, to test for decline from a youthful peak of health.

3-D Facial photography at Phase 45 in Dunedin



These Dunedin cohort members are 45 years old



Composites of
10 Dunedin
Study cohort
members,
all born 1972.



Each
composite is
created from
10 faces with
Psychomorph.

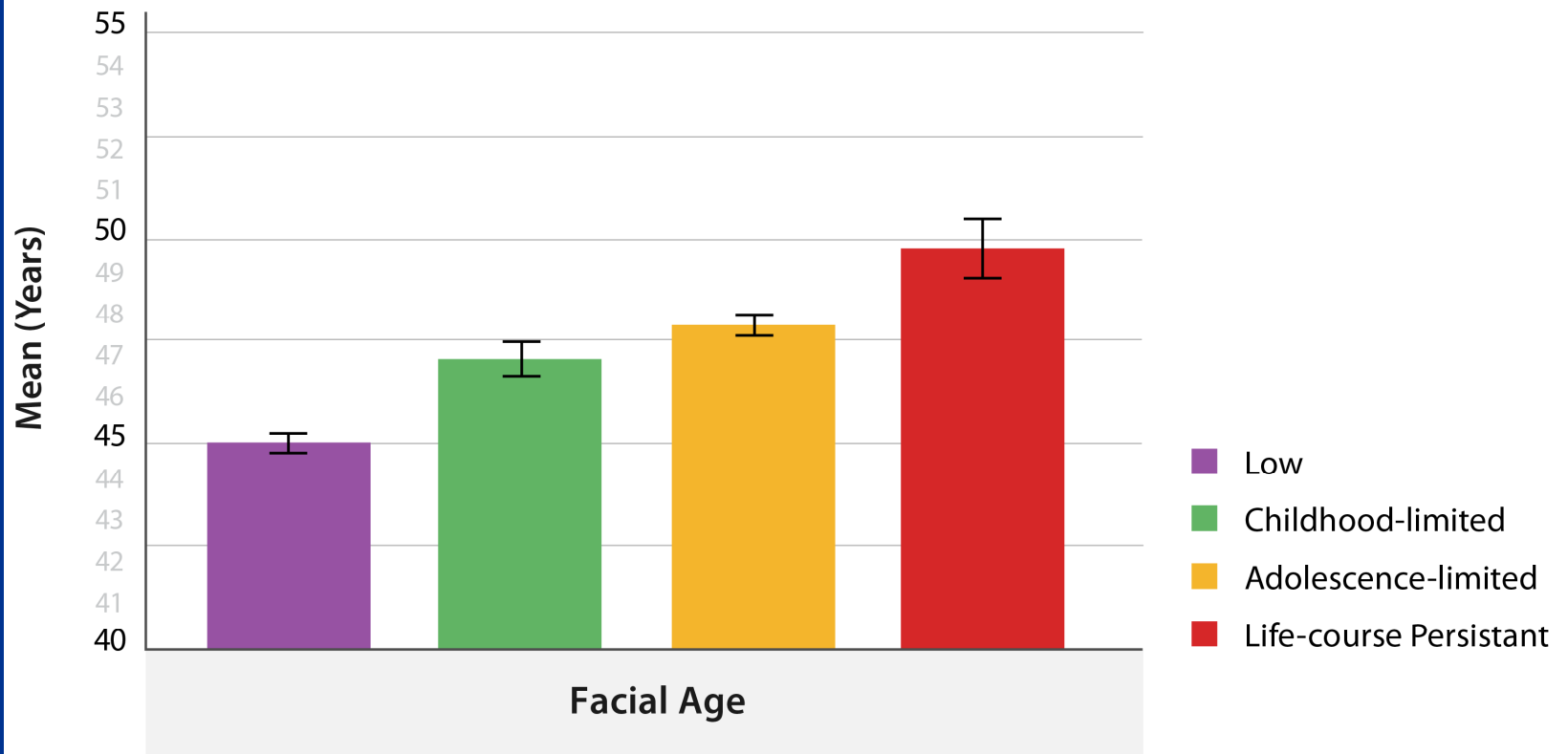
These cohort members are 45 years old too



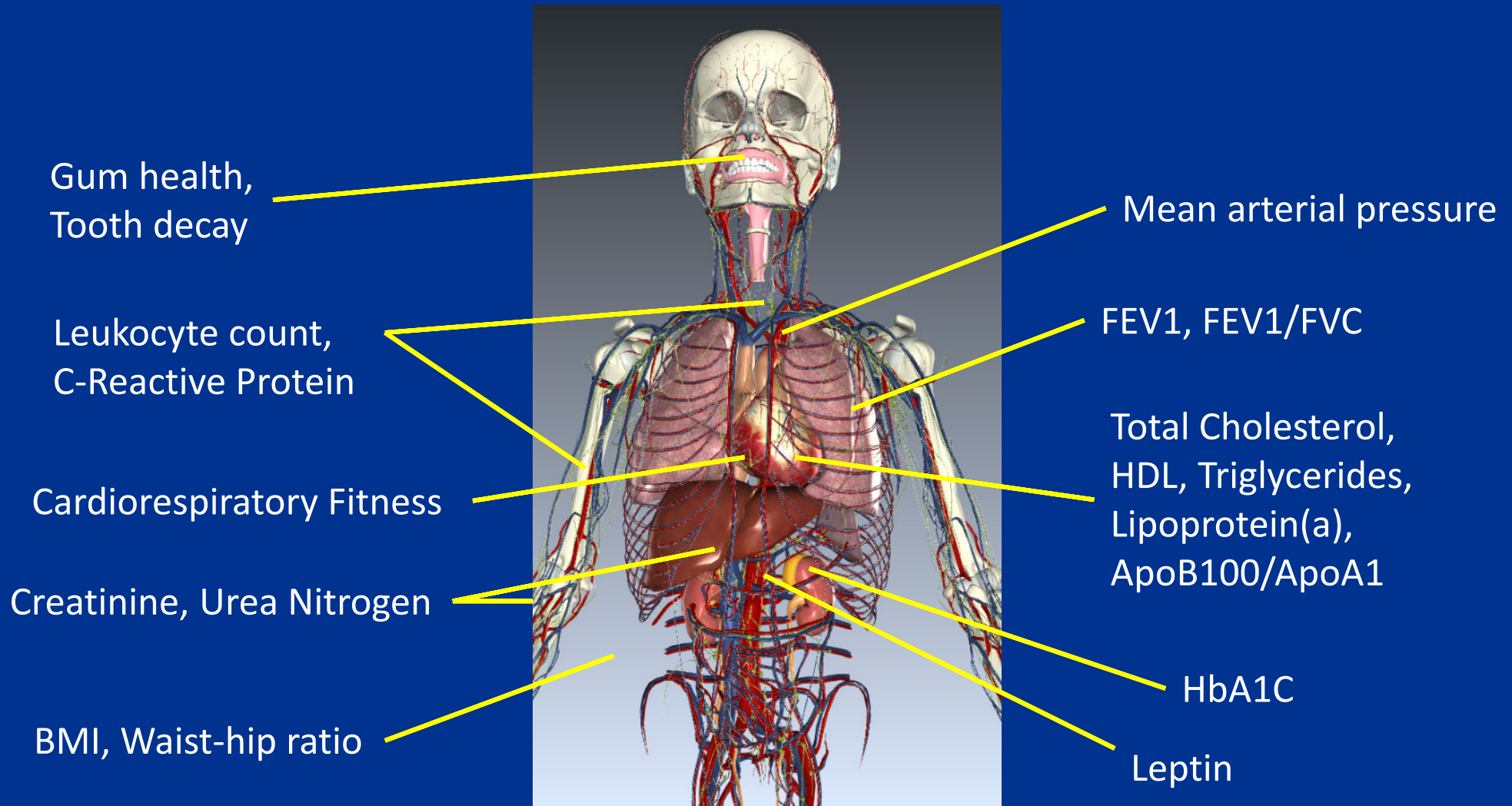
Fastest-aging 10
Dunedin Study
Cohort women
and men

Elliott, Caspi... and Moffitt, *Nature Aging*, 2021

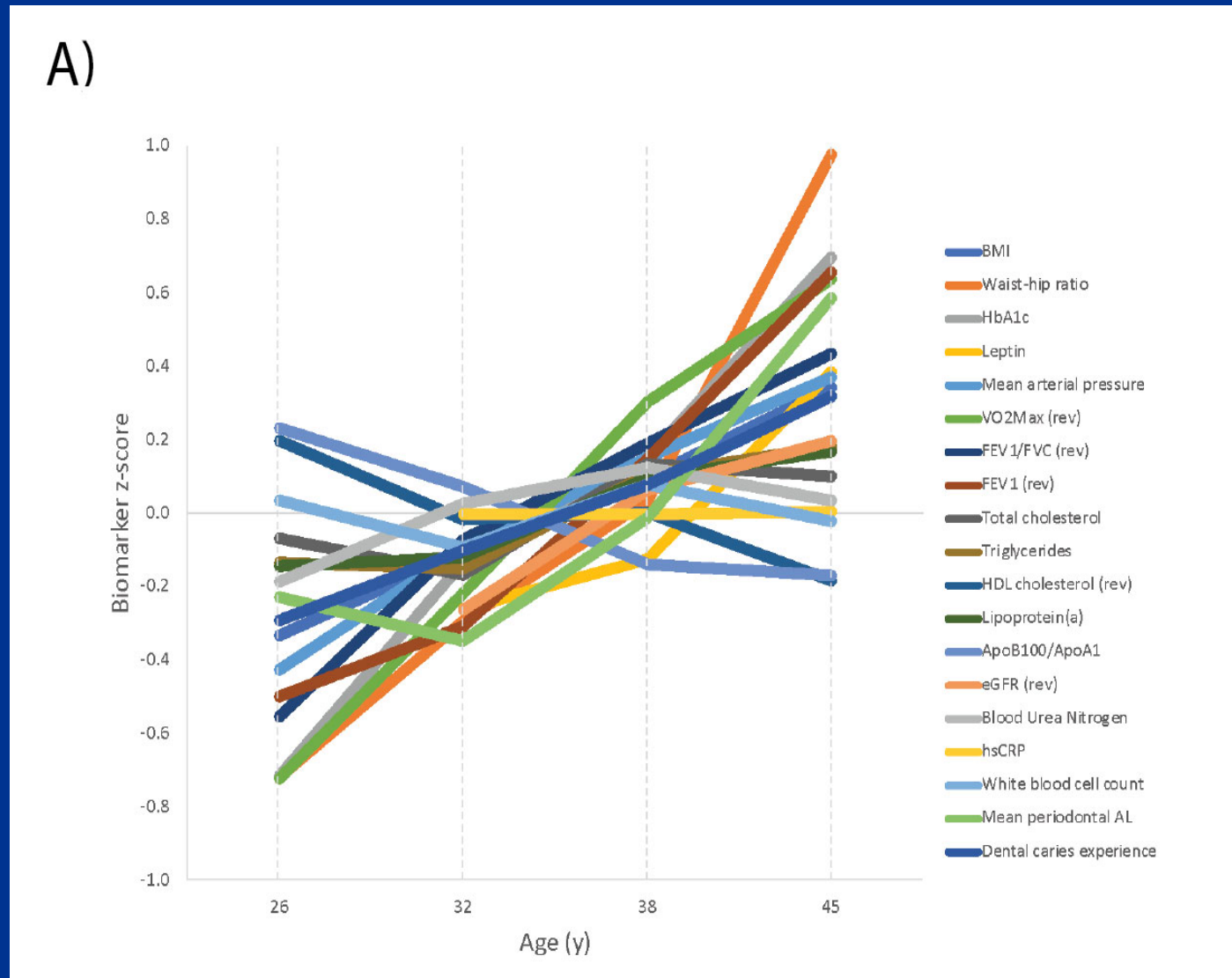
Life-course Persistent Antisocial Behavior is Associated with Older Facial Age



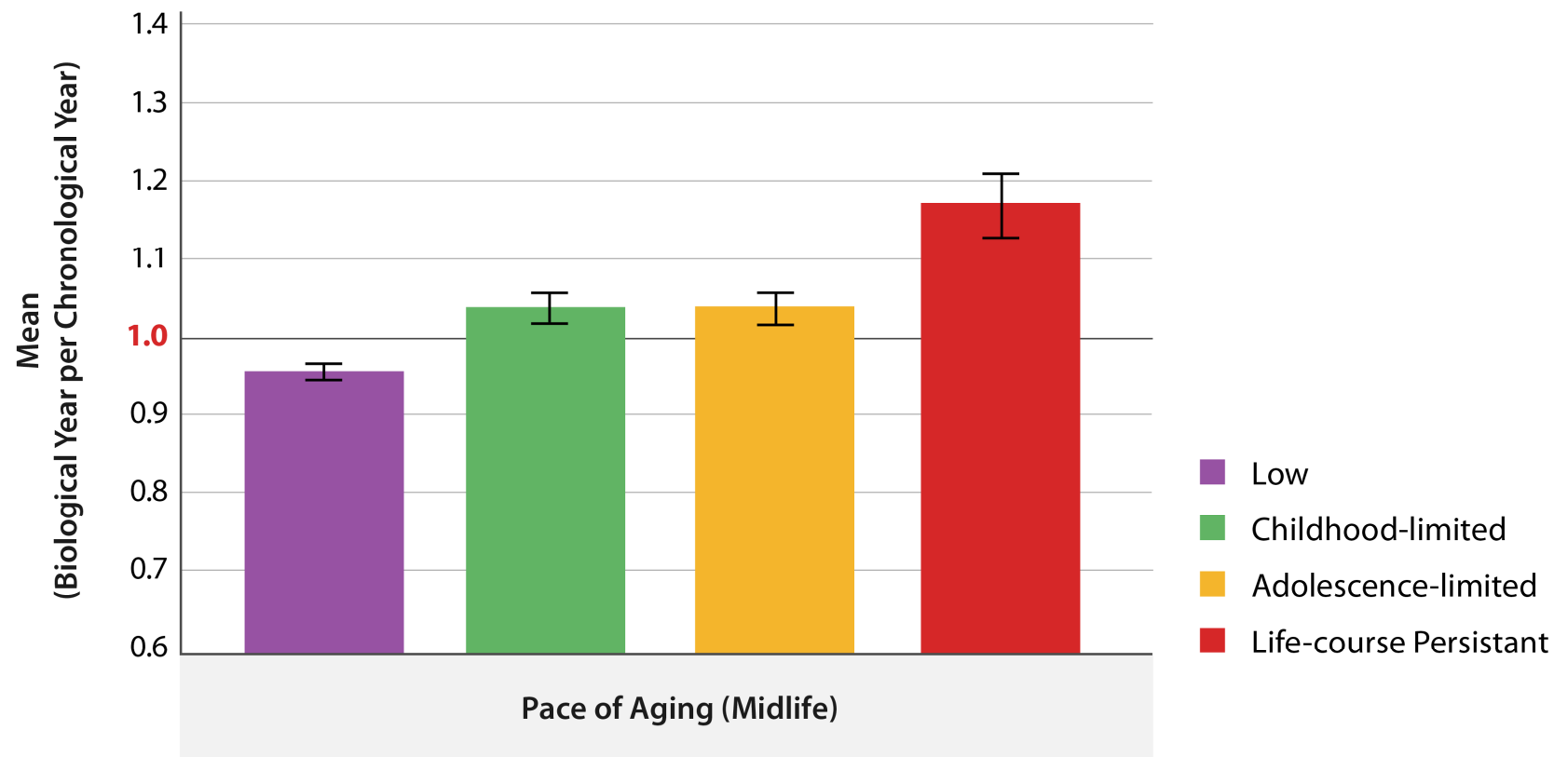
19 biomarkers track coordinated physiological deterioration: age 26, 32, 38, 45 years



Biomarker Panel: Correlated Worsening in Physiological Integrity from Age 26 to 45



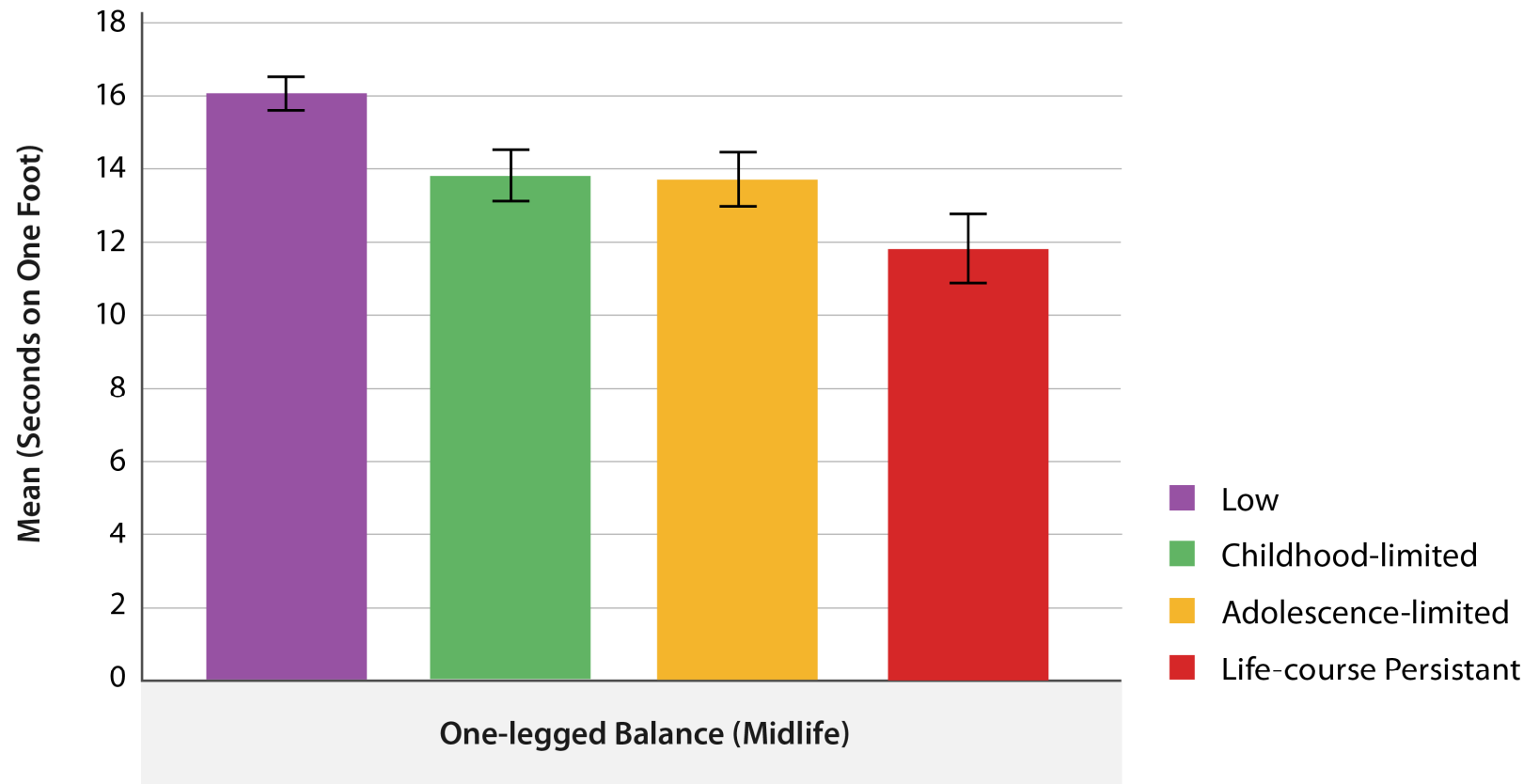
Life-course Persistent Antisocial Behavior is Associated with Accelerated Whole-body Pace of Aging



Physical function: one-leg balance



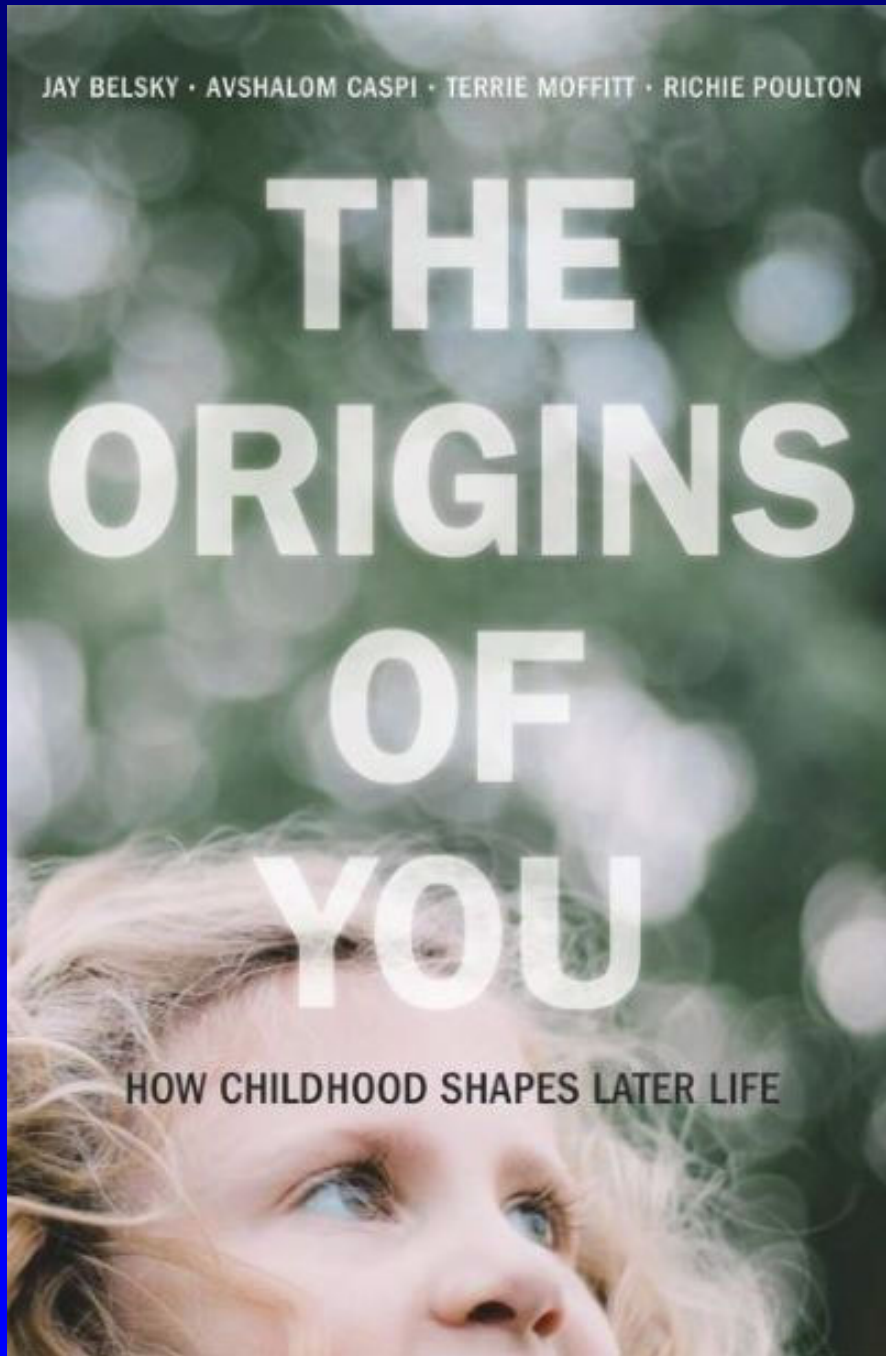
Life-course Persistent Antisocial Behavior is Associated with Poorer Balance



JAY BELSKY • AVSHALOM CASPI • TERRIE MOFFITT • RICHIE POULTON

THE ORIGINS OF YOU

HOW CHILDHOOD SHAPES LATER LIFE



Harvard University
Press, 2020

Tests of the taxonomy by other research teams in 16 countries, and nonwhite ethnic groups

- Moffitt, T.E. (2006).
In D. Cicchetti & D. Cohen. Developmental
Psychopathology, 2nd edition.
- Moffitt, T.E. (2018).
Nature Human Behaviour.

Implications for Prevention: Life-Course Persistent Offenders

- Half of the crime rate
- Small numbers, disproportionate societal costs
- Early-childhood primary prevention
- Public-health approaches to reduce infant neuro-developmental problems
- Multimodal approach: child, family, school, justice system
- A chronic cumulative condition needs life- long sustained intervention

Implications for Prevention: Adolescence-Limited Offenders

- Other half of the crime rate
- Good candidates for positive change
- Healthy attachment bonds and good school achievement
- Stop deviant peer influences on them
- Prevent “snares” that may retard natural desistence: addictions, lost education, an official conviction record
- Diversion to give them a chance to reform

IMPACT

- Difficult to trace provenance of an idea
- Real-world impact from science takes 17 years on average
- Once a finding is used, policy makers stop crediting the original publications

“For improving the lives of young people
in conflict with the law around the world”



2018 award
International
Juvenile
Justice
Observatory

IMPACT

- Hard for researchers to control use
- US Supreme court decisions:
- Death penalty for violent juveniles 2004
- Life without parole for juveniles 2009, 2017
- The 1993 theory was invoked to argue both sides

IN THE Supreme Court of the United States

DONALD P. ROPER, Superintendent,
Potosi Correctional Center,

v.

CHRISTOPHER SIMMONS,

PETITION FOR WRIT OF CERTIORARI TO THE SUPREME COURT OF MISSOURI

Petitioner

Respondent



GRAINS! LEFT PAGE

ST. LOUIS POST-DISPATCH

WEDNESDAY, NOVEMBER 10, 1999

Court bars juvenile executions

A LOCAL CASE YIELDS A LANDMARK DECISION • 72 DEATH SENTENCES ARE THROWN OUT

By Joe Simon
Staff Writer

WASHINGTON — The Supreme Court ruled Tuesday that the death penalty for juveniles is unconstitutional, ending a long legal battle that has spanned more than two decades.

The landmark ruling came in a case in which the Missouri Supreme Court had ordered the execution of Christopher Simmons, a 17-year-old who was charged with the murder of a woman who was killed in 1994.

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By The Staff
Staff Writer

Justices who opposed the ruling of the U.S. Supreme Court's ruling in the Christopher Simmons case are being forced to change their minds.

The court has recognized that juveniles are different from adults, and that the death penalty is inappropriate for them.

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NEER REACTIONS IN ST. LOUIS

St. Louis County Prosecuting Attorney Robert S. McCullough called the ruling a "win for justice."

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Christopher Simmons, 17, was charged with the murder of a woman who was killed in 1994.

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2 April, 2022

Dear Professor Moffitt,

Your research helped me make the most difficult decision that I have faced in my 20 years on the bench: whether to sentence a 16-year-old to life without parole. The central issue was whether his youth should be considered in mitigation...I simply offer my thanks.

XXXXXX XXXXXX,
Justice of the State Supreme Court



Duke
UNIVERSITY

Institute of
Psychiatry **KING'S**
at The Maudsley *College*
LONDON

