

Inequality, Social Mobility, and Public Policy

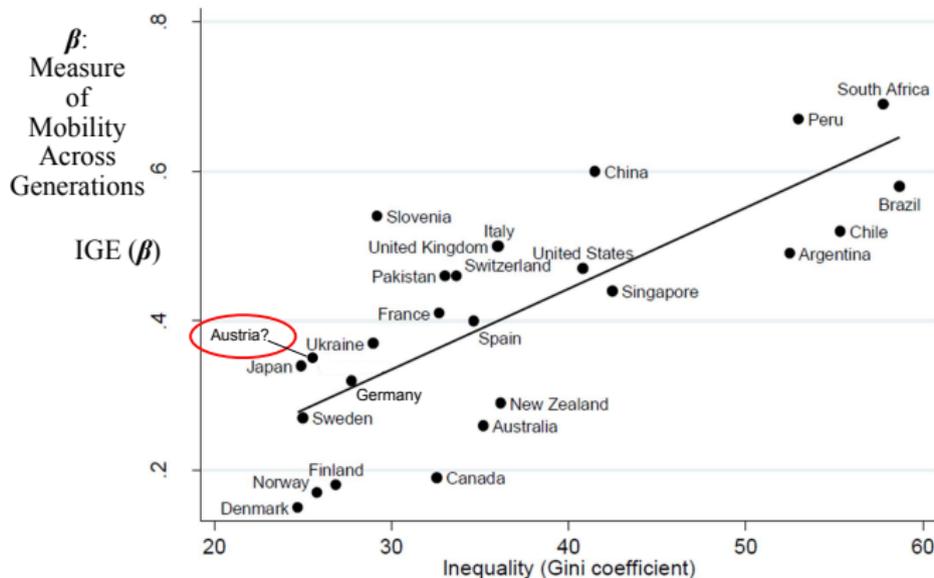
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Award of Doctor Honoris Causa
Vienna University of Economics and Business
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Figure 1: Intergenerational Mobility and Inequality: The Great Gatsby Curve

$$\underbrace{\ln Y_1}_{\text{income of child}} = \alpha + \underbrace{\beta}_{\text{IGE}} \underbrace{\ln Y_0}_{\text{income of parent}} + \varepsilon$$

$\beta \uparrow, \text{ Mobility } \downarrow$



How to interpret this relationship?
What public policies (if any) are indicated?

- Inequality $\uparrow \Rightarrow \beta \uparrow$?
- $\beta \uparrow \Rightarrow$ inequality \uparrow ?
- Limited access to markets \Rightarrow both $\beta \uparrow$ and inequality \uparrow ?

**The traditional approach to inequality is “alms to the poor”
or “redistribution.”**

- Focuses on income redistribution at a point in time

Figure 2: Market incomes are distributed much more unequally than net incomes

Inequality (Gini coefficient) of market income and disposable (net) income in the OECD area, working-age persons, late 2000s

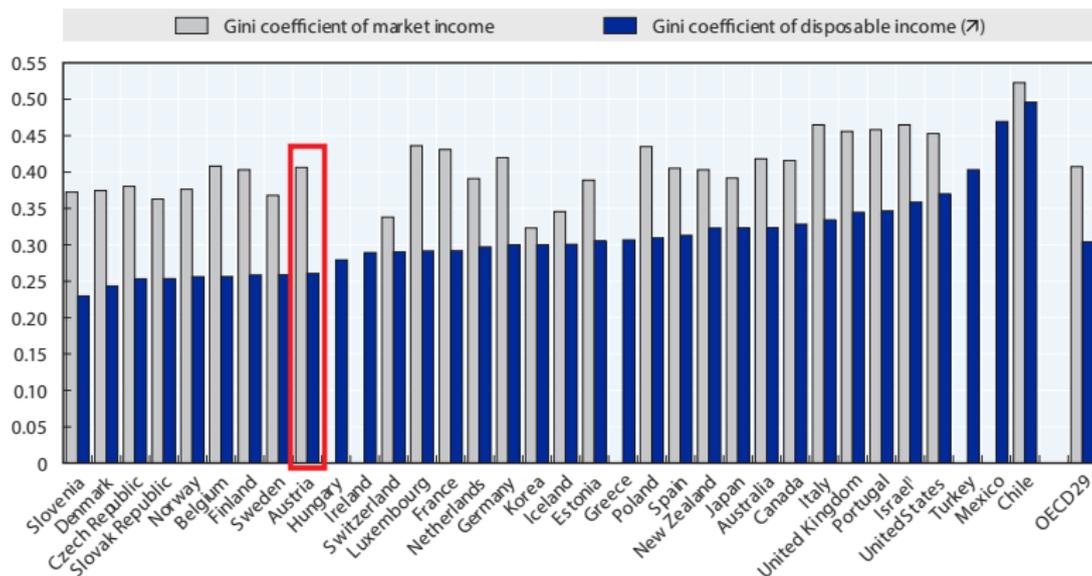
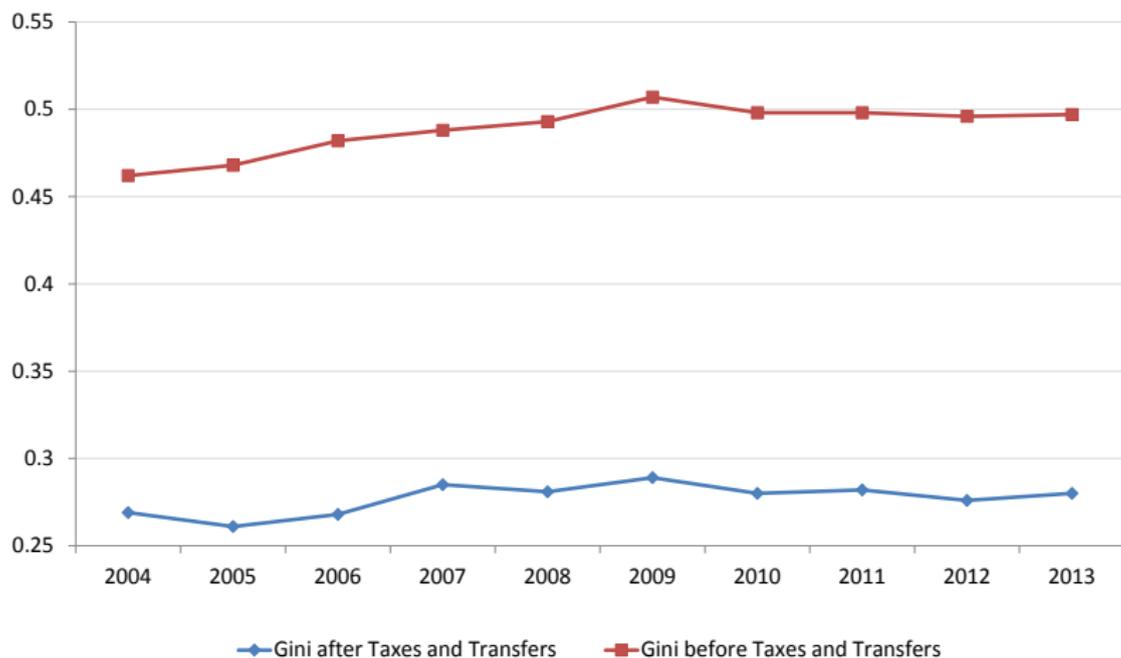


Figure 3: Gini Coefficients of Market Income and Disposable Income, Austria



Source: OECD Income Distribution and Poverty Database.

II. My Proposal

**A Comprehensive Approach to Social Policy
and Efficient Redistribution to
Promote Mobility within and Across Generations**

Recognize:

- (1) Fundamental importance of skills in modern economies
- (2) Multiplicity of skills
- (3) The multiple institutions producing skills
 - (a) Schools
 - (b) Families
 - (c) Firms
- (4) The importance of supporting and incentivizing all of these institutions
- (5) Recent knowledge on effective targeting of skills
- (6) Value of evaluation schemes accounting for costs and benefits measured in terms of social opportunity costs

Predistribution, Not Just Redistribution

Fragmented Solutions

- Current policy discussions often have a fragmented quality.

Examples of Fragmented Solutions

- For crime, have more police.
- To promote skills, build more schools, hire better teachers, and raise test scores.
- For health, have more doctors and medical facilities. Promote nutrition: micro and macronutrients.
- For teenage pregnancy, conduct pregnancy prevention programs.
- To reduce inequality, give cash transfers and promote housing programs for the poor.

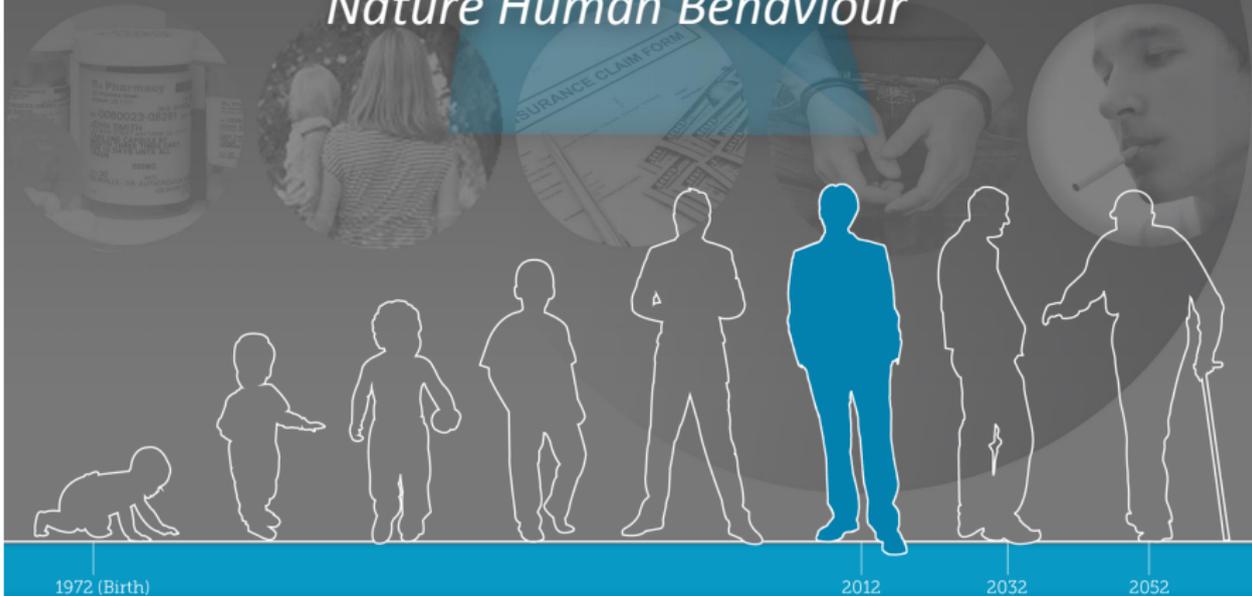
“The Squeaky Wheel Gets the Grease”

Evidence on the Effectiveness of Targeting, and Targeting Early

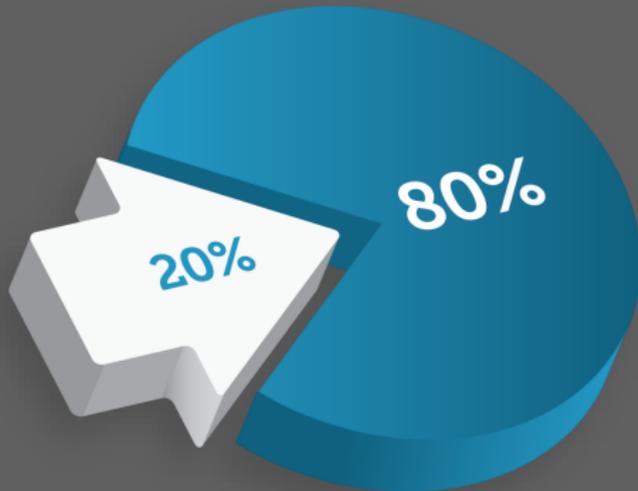
- 80% of adult social problems regarding health, healthy behaviors, crime and poverty are due to 20% of the population.
- Reliable indicators of these problems by age 5 (Caspi et al., 2016).

Childhood Forecasting of a Small Segment of the Population with Large Economic Burden

Caspi, Moffitt, et al. (2017)
Nature Human Behaviour



The Pareto Principle

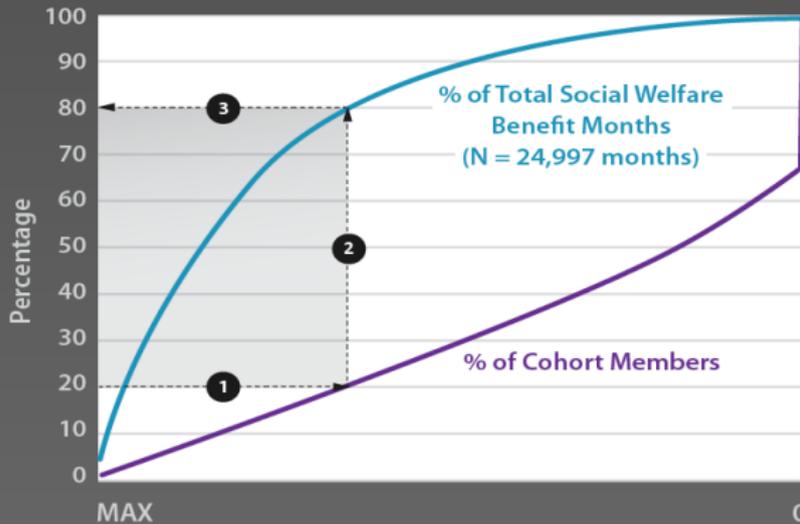


20% of the Actors
Account for **80%**
of the Results.

Vilfredo Pareto, 1848-1923

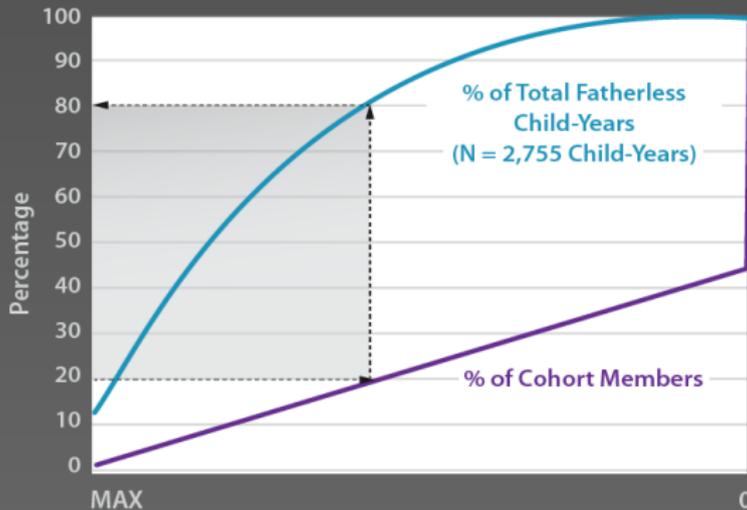
Social Welfare Benefit Months

20% of Cohort Members = 80% of Total Social Welfare Benefit Months



Absent-Father Parenting

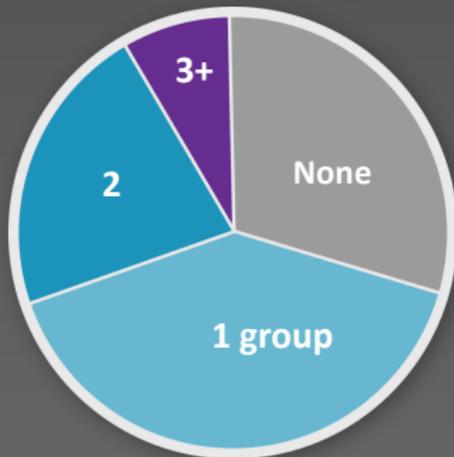
20% of Cohort Members = 82% of Total Fatherless Child-Years



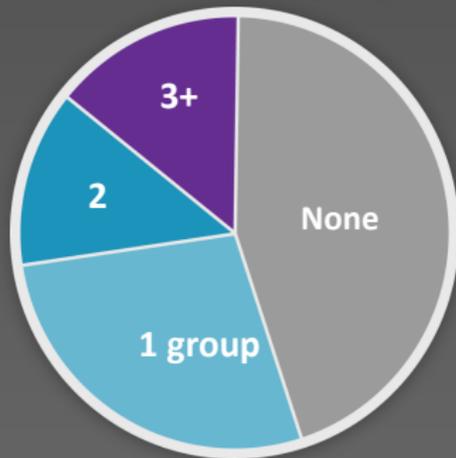
[Link to Additional Caspi et al. Slides](#)

Concentration of High-Cost Groups in the Dunedin Birth Cohort

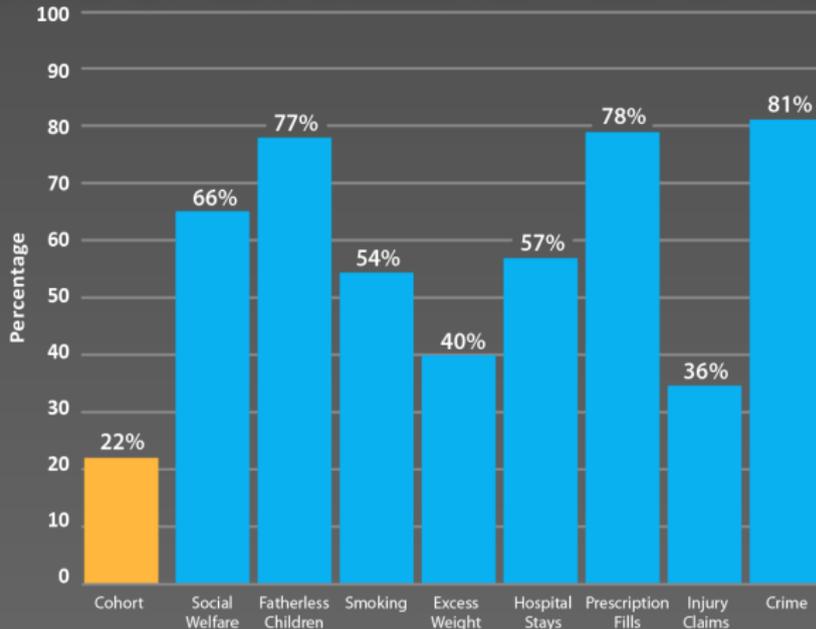
Chance Overlap



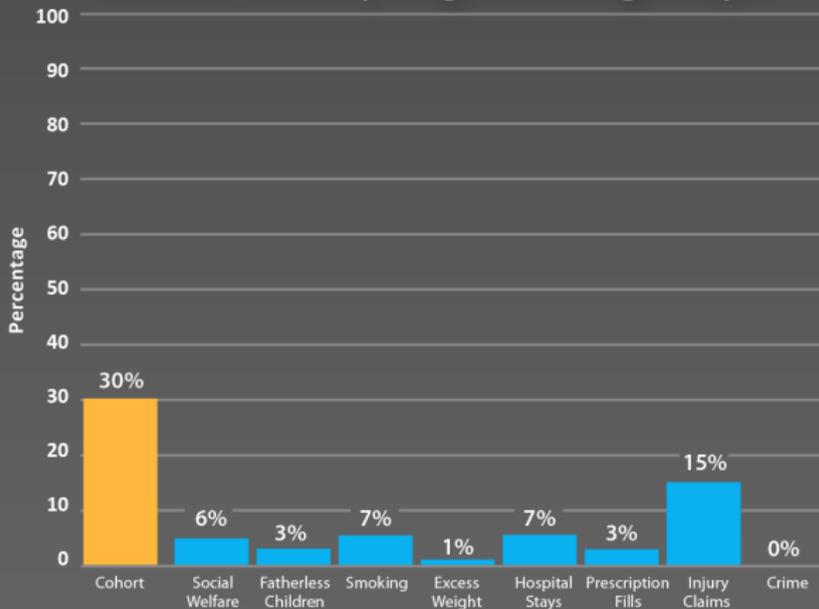
Observed Overlap



The High-need/High-cost Group in 3 or more sectors: How many health/social services do they use?



Small Footprint of cohort members never in any high-cost group:



Childhood Risk Factors to Describe High-cost Actor Groups: Composites across ages 3, 5, 7, 9, 11

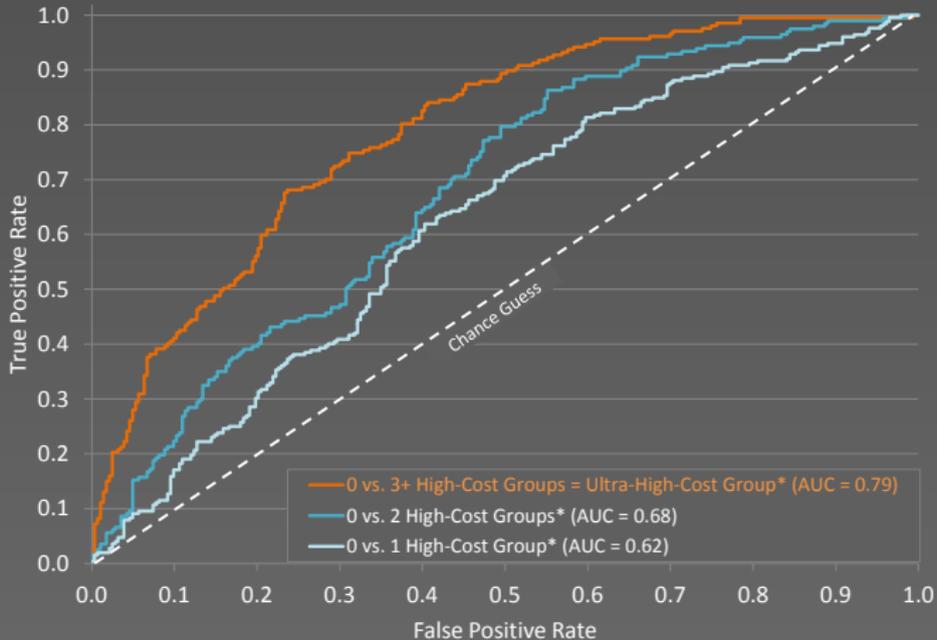
- IQ
- Self-control
- SES (socio-economic status)
- Maltreatment

Age-3 Brain Health:

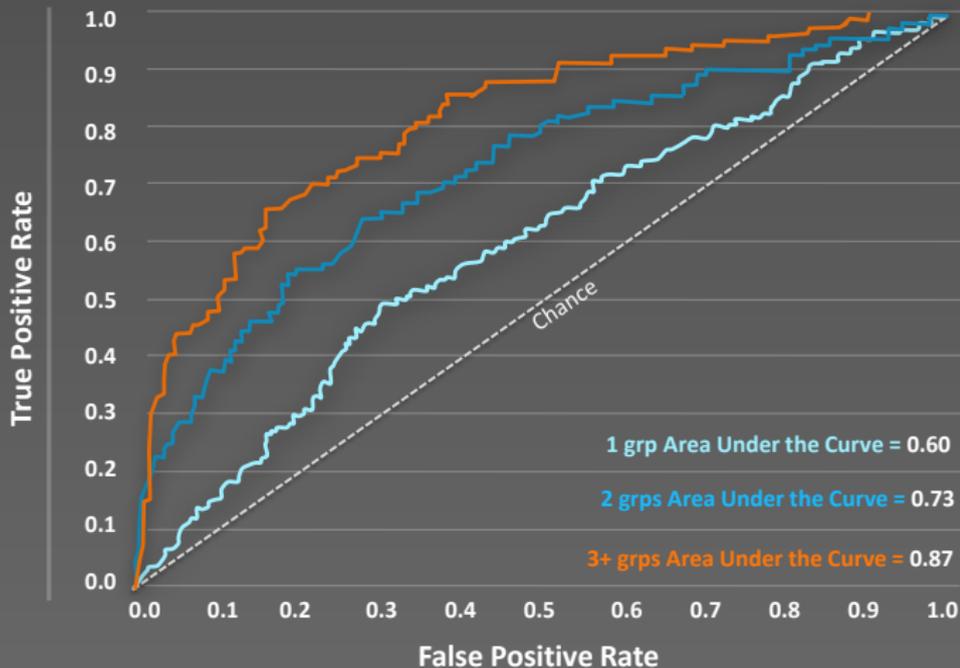
45-minute standardized assessment of Dunedin cohort 3-year-olds in 1975

- Neurologist's examination of soft signs
- Peabody Picture IQ test
- Reynell Receptive Language test
- Bayley Motor Skills test
- Examiner-rated poor behavior control

Age-3 Brain Health predicts high-need/high-cost group



ROC-Curve Discriminating Individuals in 0 vs. 1, 0 vs. 2, and 0 vs. 3+ User Groups



Summary of findings

- 20% of people contribute 80% of social/health problems.
- A high-need/high-cost population segment uses ~half of resources in multiple sectors.
- Most high-need/high-cost people in this segment share risk factors in the first decade of life;
- Prediction is stronger than thought; AUC approaches .90.
- Brain integrity in the first years of life is important.

Seen in this way, early-life risks seem important enough to warrant investment in early-years preventions.

Targeting Early Indicated

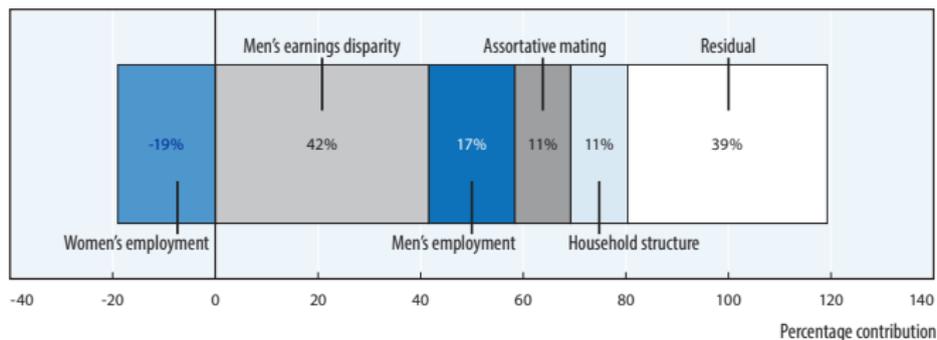
Policy Synergies Exploit Understanding That Skill Deficits and Shortages Are Common Sources of Many Social Problems

Skills: Capacities to Act and to Create Future Skills

Skills Play a Major Role in Shaping Inequality

Figure 4: OECD Inequality: Demographic changes were less important than labour market trends in explaining changes in household earnings distribution, but skills play an important role

Percentage contributions to changes in household earnings inequality, OECD average, mid-1980s to mid-2000s



Note: Working-age population living in a household with a working-age head. Household earnings are calculated as the sum of earnings from all household members, corrected for differences in household size with an equivalence scale (square root of household size). Percentage contributions of estimated factors were calculated with a decomposition method which relies on the imposition of specific counterfactuals such as: "What would the distribution of earnings have been in recent year if workers' attributes had remained at their early year level?"

Source: Chapter 5, Figure 5.9, OECD (2013).

- Earnings disparities arise because of:
 - (a) Differences in skills.
 - (b) Differences in the prices of skills.

Modern Understanding of Skill Development

III. Some Evidence on Effective Policy Based on Understanding of Mechanisms of Skill Formation

The Importance of Cognition and Character

- (a) Major advances have occurred in understanding which human capacities matter for success in life.
- (b) Cognitive ability as measured by IQ and achievement tests is important.
There is hard empirical evidence on its importance.
- (c) So are the **socio-emotional skills** – sometimes called character traits or personality traits:

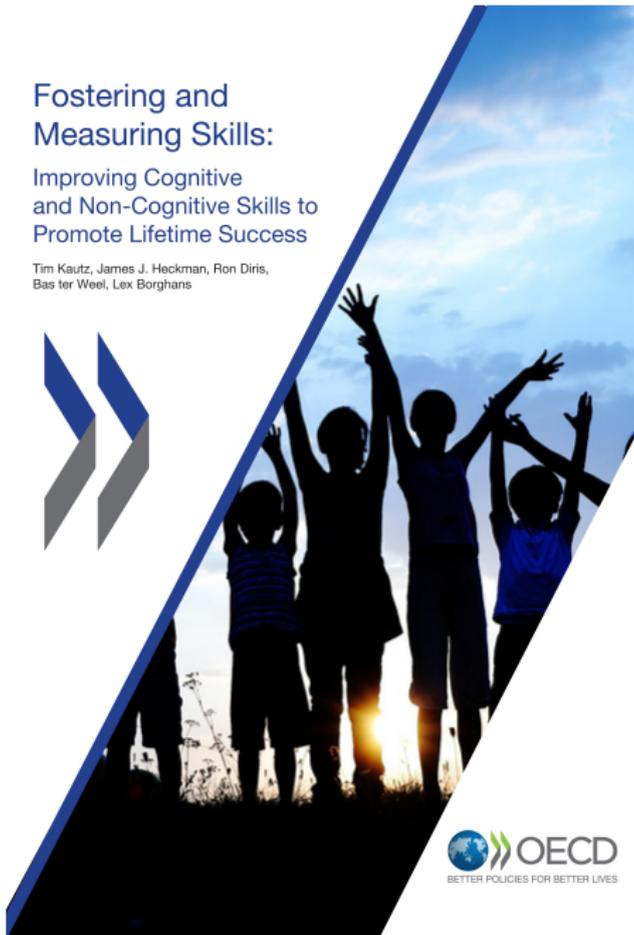
- Motivation
- Sociability; ability to work with others
- Attention
- Self Regulation
- Self Esteem
- Ability to defer gratification
- Health and Mental Health

- **Beyond PISA scores**

Fostering and Measuring Skills:

Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success

Tim Kautz, James J. Heckman, Ron Diris,
Bas ter Weel, Lex Borghans



Link to Report PDF
<http://tinyurl.com/OECD-Report-2014>

Cognitive and Socioemotional Skills Affect:

- (a) Crime
- (b) Earnings
- (c) Health and healthy behaviors
- (d) Civic participation
- (e) Educational attainment
- (f) Teenage pregnancy
- (g) Trust
- (h) Human agency and self-esteem

Variance of log of earnings explained by various skills

	NLSY (U.S.)	MIDUS (U.S.)	BCS (U.K.)
Cognitive traits alone	0.031	0.018	0.024
Non-cognitive traits alone	0.021	0.050	0.053
Cognitive & non-cognitive skills together	0.040	0.060	0.061
Schooling alone	0.036	0.048	0.109
All together: Cogn., non-cogn. and schooling	0.080	0.084	0.141

Skill Gaps Open Up Early

- Gaps in skills across socioeconomic groups open up very early:
 - Persist strongly for cognitive skills
 - Less strongly for noncognitive skills
 - Widen by age for many biological skills
- Skills are not set in stone at birth—but they solidify as people age. They have genetic components.
- Skills evolve and can be shaped in substantial part by investments and environments.

Figure 5: Mean Achievement Test Scores by Age by Maternal Education

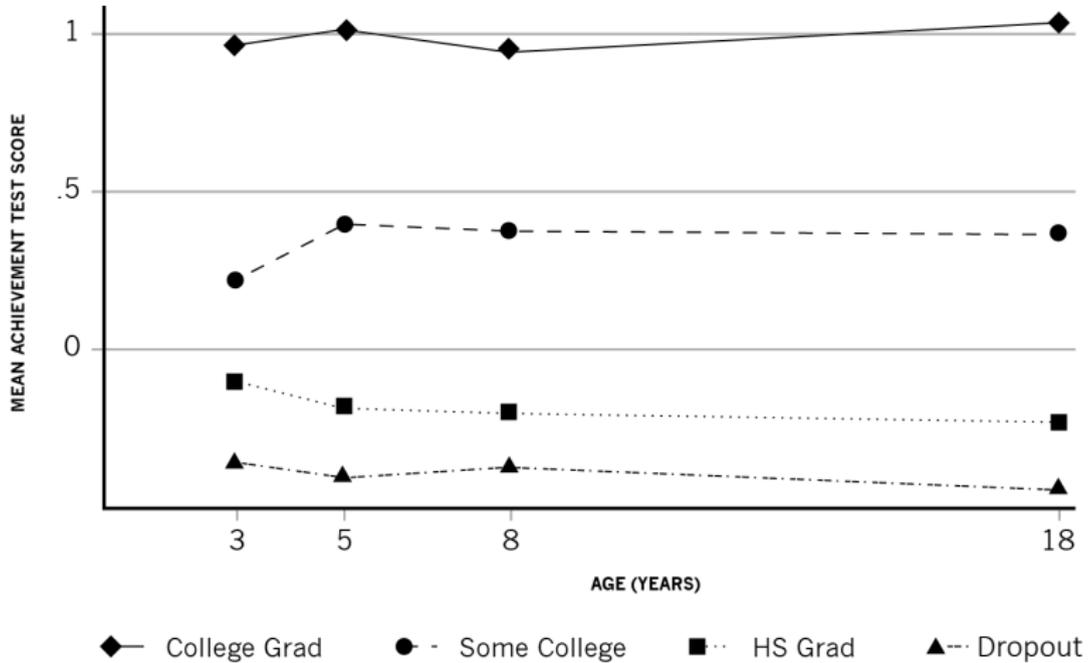
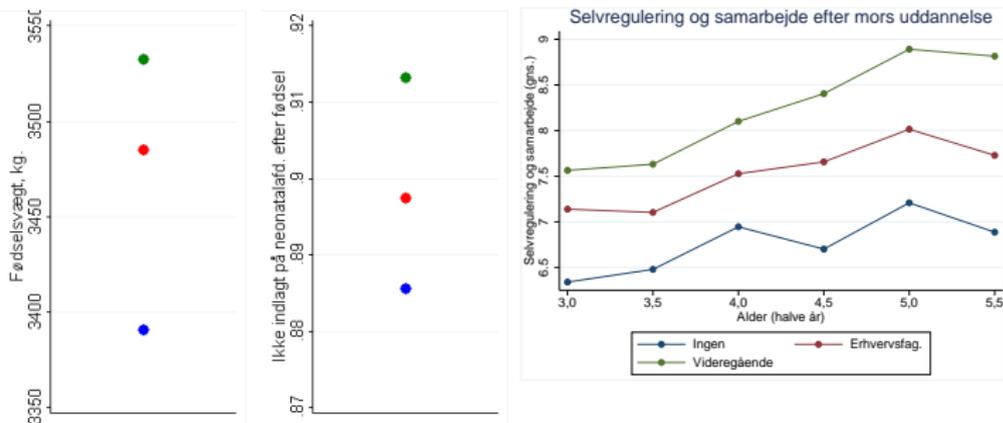


Figure 6: Gaps throughout life, by mother's level of education, Denmark



Age:

0 yrs

0 yrs

3-5 yrs

Outcome:

Birth weight

Not admitted to
neo-natal ward

Score for self-
regulation

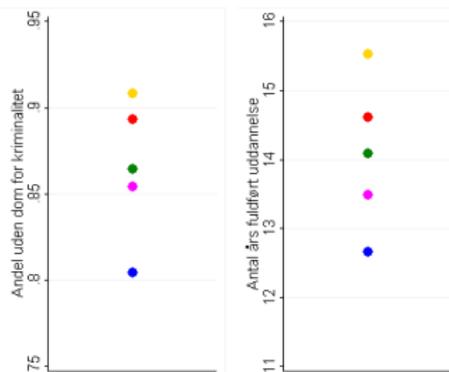
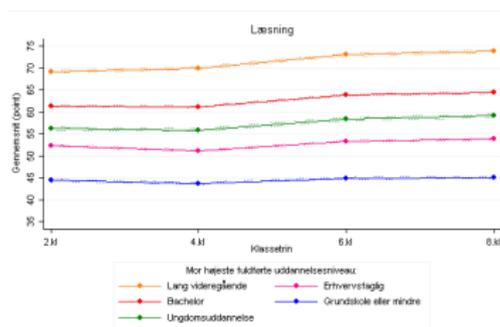
Unit:

Gram

Fraction

Rating

Figure 6: Gaps throughout life, by mother's level of education, Denmark, Cont'd

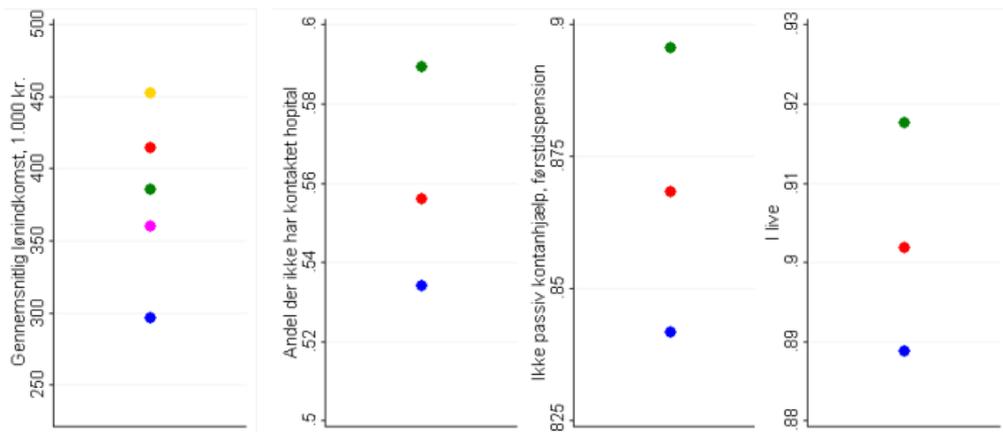


Age: 8–14 yrs 25 yrs 30 yrs

Outcome: Test scores, Danish in national tests No criminal conviction Years of schooling

Unit: Test score Fraction Years

Figure 6: Gaps throughout life, by mother's level of education, Denmark, Cont'd



Age:

40 yrs

40-50 yrs

54 yrs

60 yrs

Outcome:

Wage earnings

Not contacted
a hospital

In the labor
force

Alive

Unit:

1.000DKK

Fraction

Fraction

Fraction

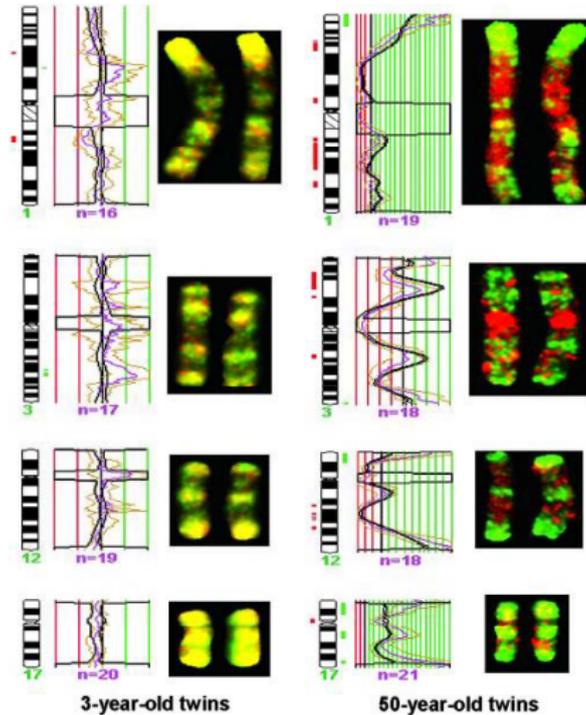
THE UNIVERSITY OF
CHICAGO

How to Interpret This Evidence

- Evidence on the early emergence of gaps leaves open the question of which aspects of families are responsible for producing these gaps.
- Is it due to genes? Should eugenic policies be promoted?
- Family environments? Neighborhood and community effects?
- Parenting and family investment decisions?
- The evidence from a large body of research demonstrates an important role for investments and family and community environments in determining adult capacities above and beyond the role of the family in transmitting genes.
- The quality of home environments by family type is highly predictive of child success.

Genes, Biological Embedding of Experience, and Gene-Environment Interactions

DNA methylation and histone acetylation patterns in young and old twins



Source: Fraga, Ballestar et al. (2005).

Family Environments and Child Outcomes

Is family influence just money?

- In the USA, children enter school with “meaningful differences” in vocabulary knowledge.

1. Emergence of the Problem

In a typical hour, the average child hears:

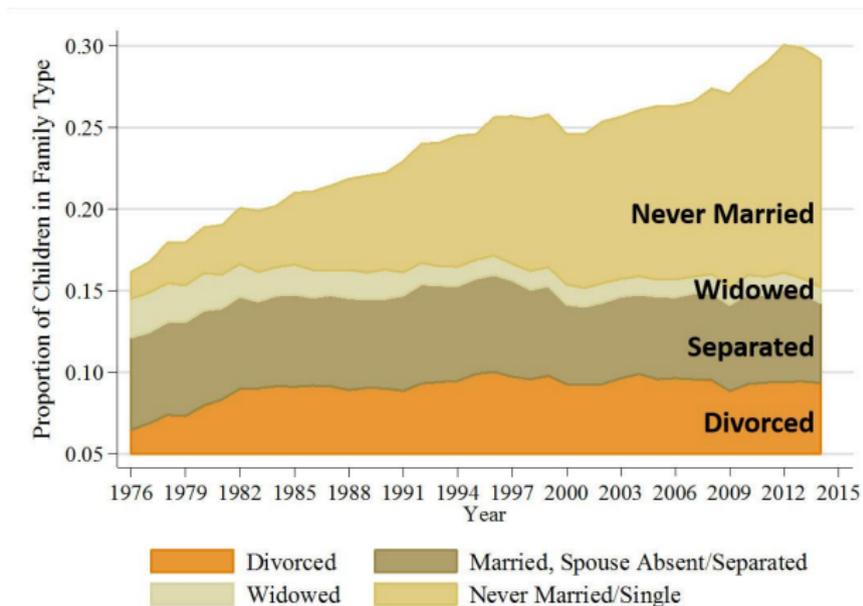
Family Status	Actual Differences in <u>Quantity</u> of Words Heard	Actual Differences in <u>Quality</u> of Words Heard
Welfare	616 words	5 affirmatives, 11 prohibitions
Working Class	1,251 words	12 affirmatives, 7 prohibitions
Professional	2,153 words	32 affirmatives, 5 prohibitions

2. Cumulative Vocabulary at Age 3

Cumulative Vocabulary at Age 3	
Children from welfare families:	500 words
Children from working class families:	700 words
Children from professional families:	1,100 words



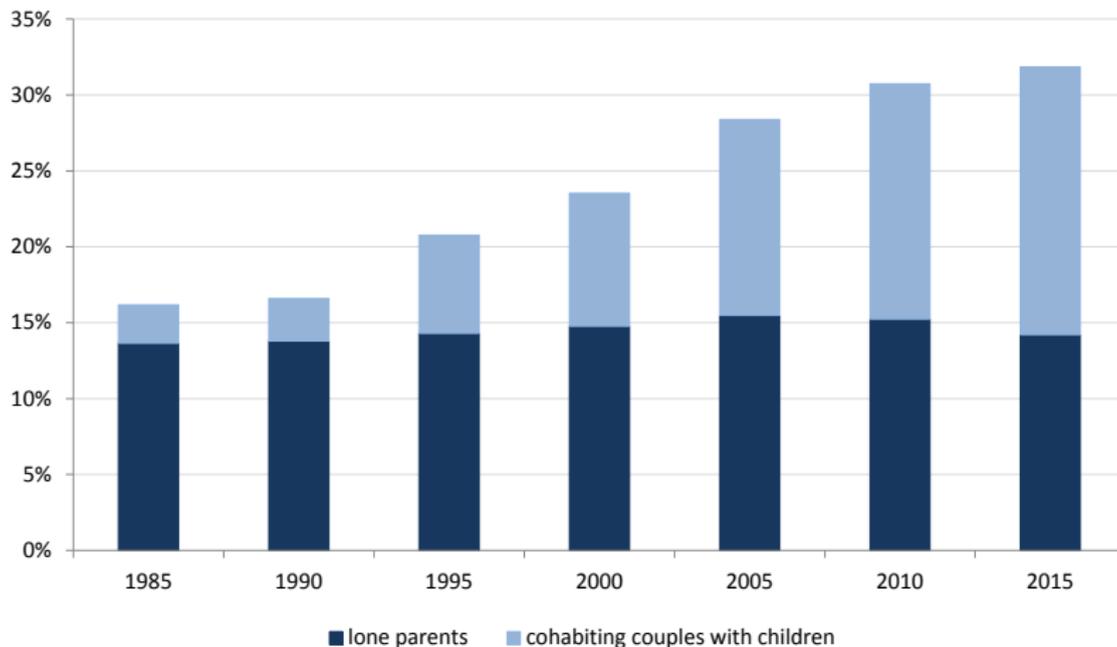
Figure 7: Children Under 18 Living in Single Parent Households by Marital Status of Parent



Note: Parents are defined as the head of the household. Children are defined as individuals under 18, living in the household, and the child of the head of household. Children who have been married or are not living with their parents are excluded from the calculation. Separated parents are included in "Married, Spouse Absent" Category.

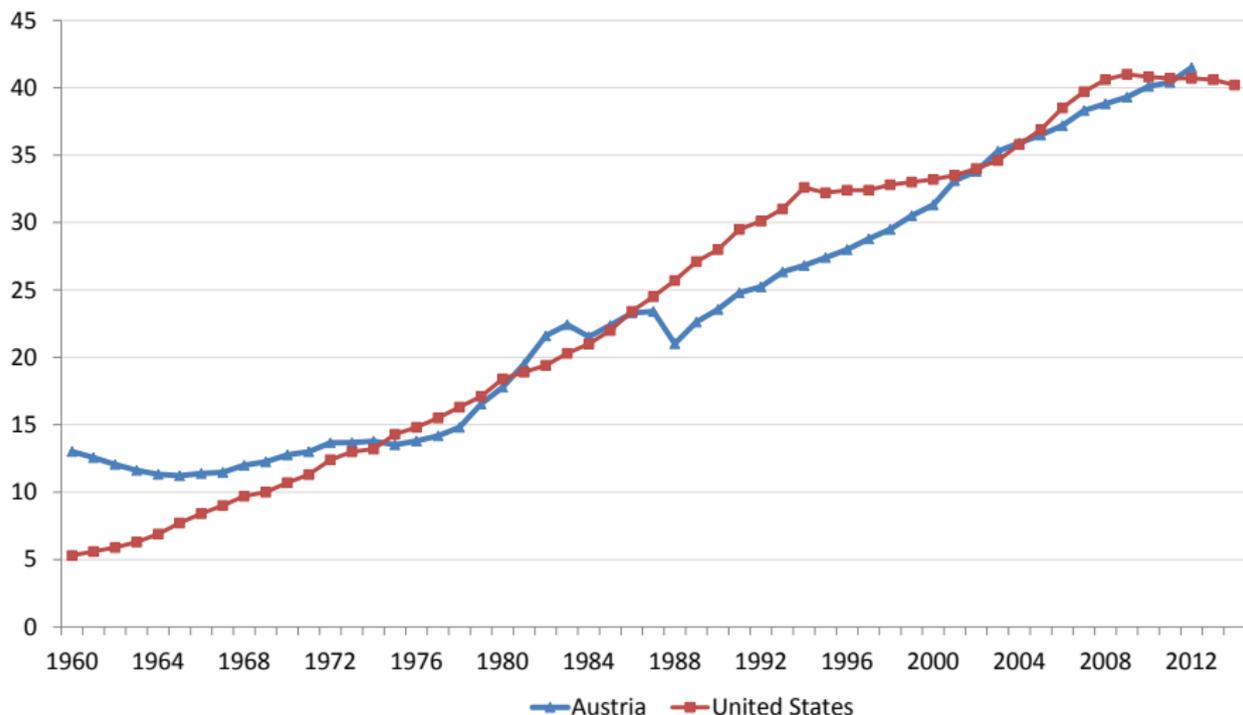
Source: IPUMS March CPS 1976-2014.

Figure 8: Proportion of Non-Traditional Families with Children under Age 15, Austria



Source: Statistics Austria.

Figure 9: Proportion of Live Births Outside Marriage



Source: Eurostat.

- Supporting family through childcare and child investment can be an effective policy for reducing inequality within a single generation and reducing inequality across generations.

Understanding the Dynamics of Skill Formation: Two Notions of Complementarity

Static Complementarity

- The productivity of investment greater for the more capable.
 - **High returns for more capable people: Matthew Effect**
 - **Does this justify social Darwinism?**
 - On grounds of economic efficiency, should we invest primarily in the most capable?
 - **Answer: It depends on where in the stage of the life cycle we consider the investment.**

Dynamic Complementarity

- If we invest today in the base capabilities of disadvantaged young children, there is a huge return.
- Makes downstream investment more productive.
- **No necessary tradeoff between equality and efficiency goals.**
- Augmenting this investment by public infrastructure and schools gives agency to people and enhances economic and social functioning.

- Both processes are at work.
- No necessary contradiction.
- Investing early creates the skill base that makes later investment productive.

Skills Beget Skills

Social-emotional Skills



Cognitive Skills, Health

(sit still; pay attention; engage in learning; open to experience)

Health



Cognitive Skills, Noncognitive Skills

(fewer lost school days; ability to concentrate)

Cognitive Skills

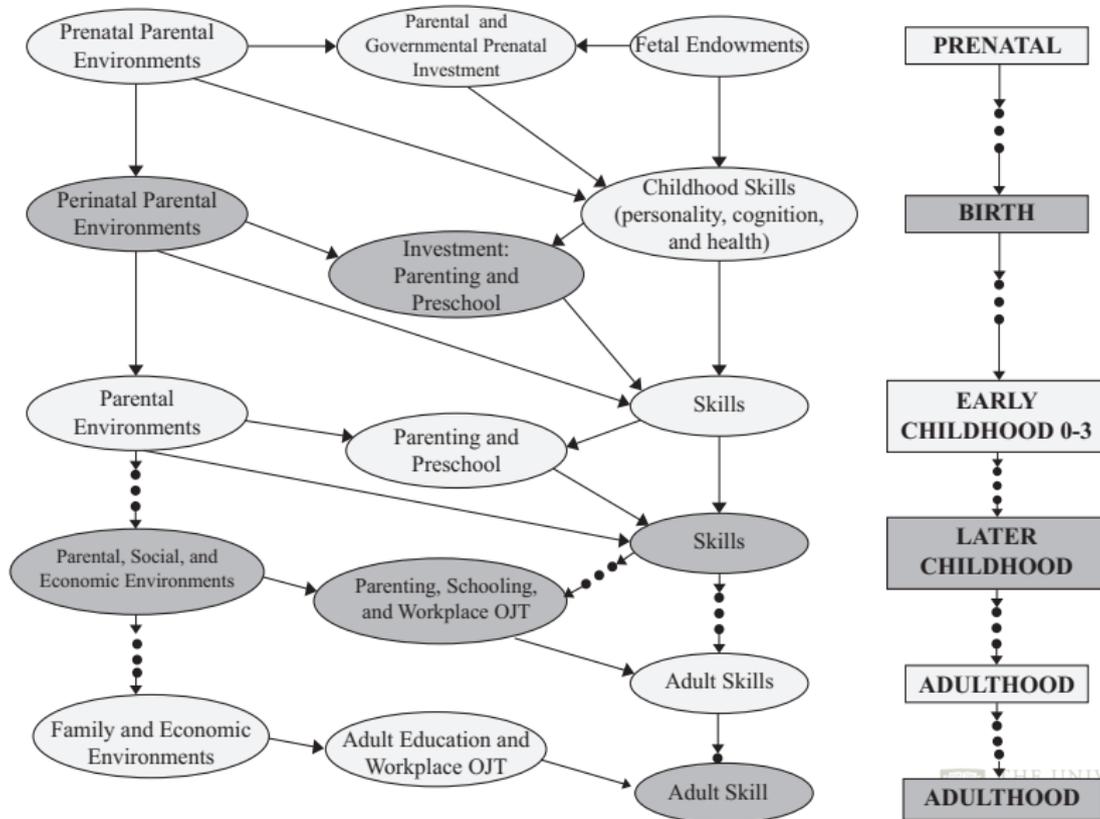


**Produce better health practices;
produce more motivation; greater
perception of rewards.**

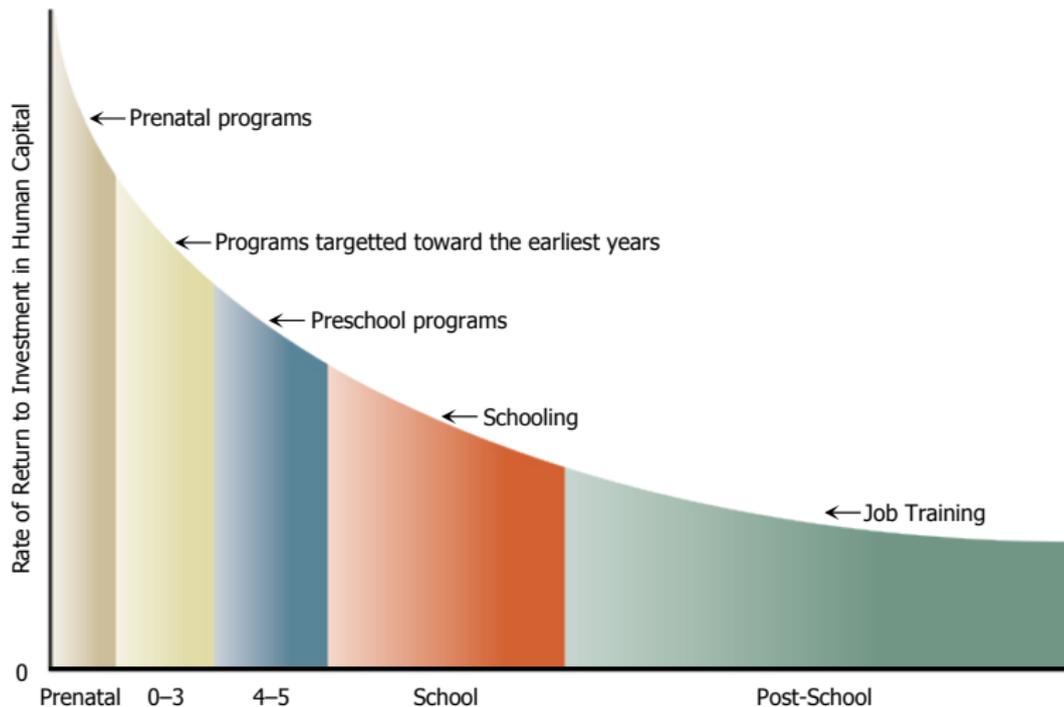
(child better understands and controls its environment)

**Outcomes: increased productivity, higher income, better health,
more family investment, upward mobility, reduced social costs.**

Figure 10: Life Cycle Developmental Framework



Returns to a Unit Value Invested



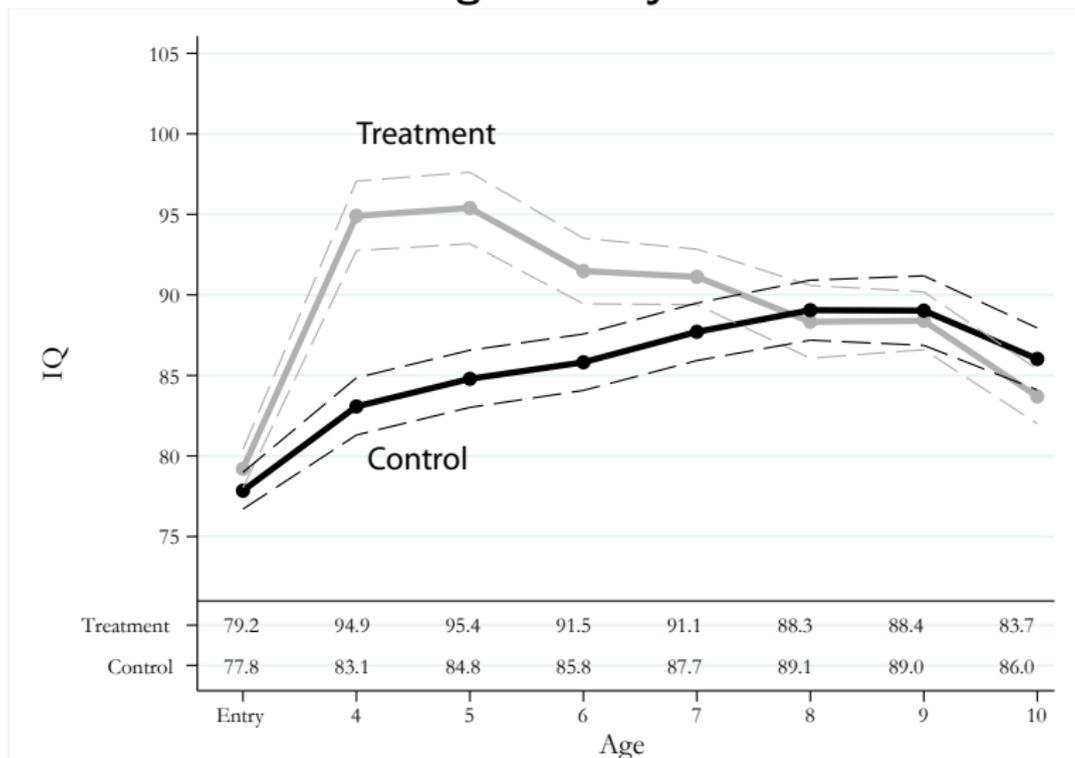
Source: Heckman (2008)

Evidence on the Effects of Early Intervention

- ① Many successful early childhood interventions followed over the life cycle operate primarily through boosting **non-cognitive** skills. IQ is often barely budged.
- ② Long term evaluations of interventions often provide a different assessment of the effectiveness of interventions than do short run evaluations.
- ③ Adolescent remediation as currently implemented is often ineffective especially for cognitive skills.

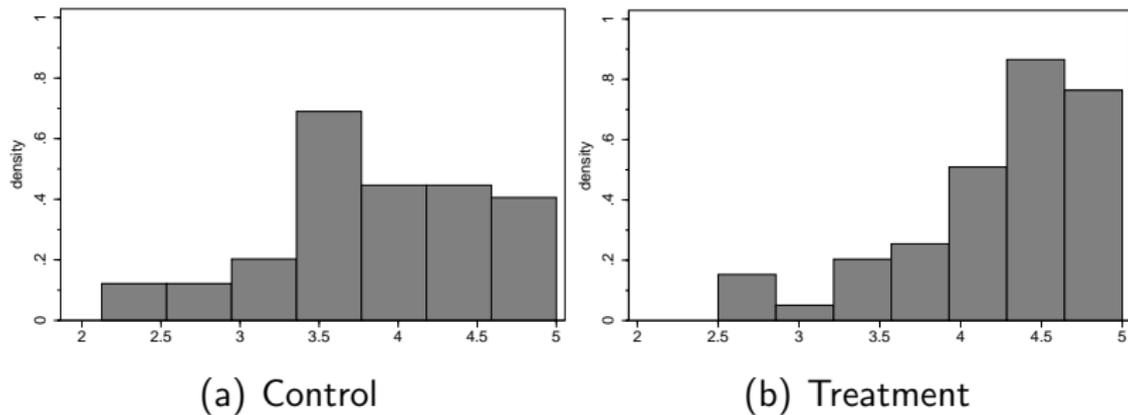
Perry Preschool Project

Male Cognitive Dynamics



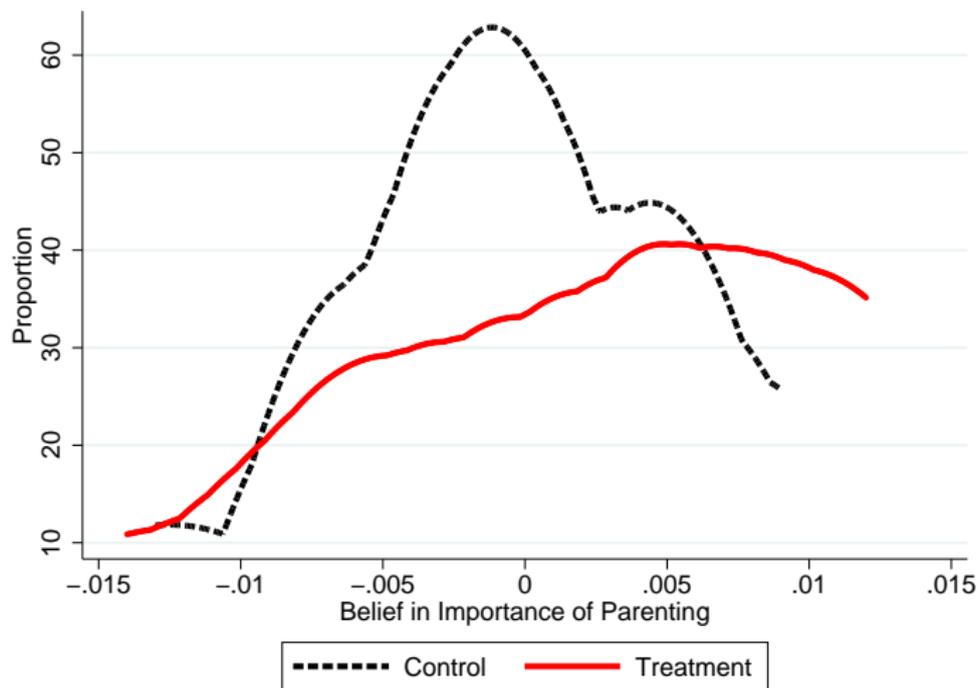
Yet the Perry Program has a statistically significant annual rate of return of around 6%–10% per annum—for both boys and girls—in the range of the post–World War II stock market returns to equity in the U.S. labor market, estimated to be 6.9%.

Figure 11: Mechanisms: Externalizing Behavior, Males



Data: Perry Preschool Program.
Source: Heckman, Pinto, Savelyev (2013).

Parental response to Perry Preschool Program after 1 year experience of treatment



The Carolina Abecedarian Project

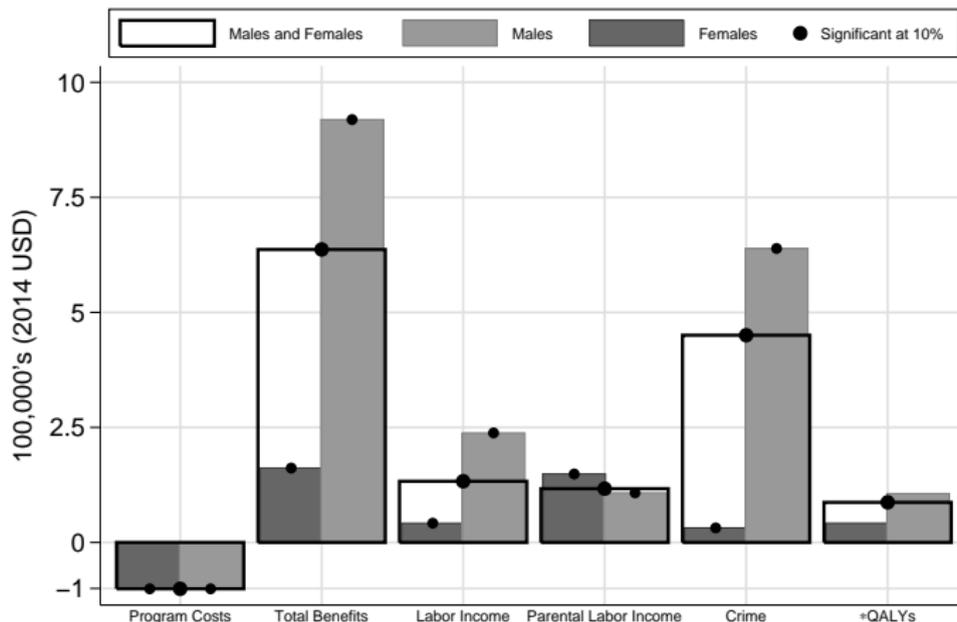
Figure 12: Abecedarian Project, Health Effects at Age 35 (Males)

	Treatment Mean	Control Mean	Treatment p-value
Systolic Blood Pressure	125.79	143.33	0.018
Diastolic Blood Pressure	78.53	92.00	0.024
Pre-Hypertension	0.68	0.78	0.235
Hypertension	0.10	0.44	0.011
HDL Cholesterol	53.21	42.00	0.067
Cholesterol/HDL-C	3.89	4.69	0.057
Abdominal Obesity	0.65	0.87	0.136
Metabolic Syndrome	0.00	0.25	0.009

Source: Campbell, Conti, Heckman, Moon, Pinto, Pungello, and Pan (2014).



Figure 13: Net Present Value of Main Components of the Cost/Benefit Analysis Over the Life Cycle per Program Participant, Treatment vs. Next Best



Per-annum Rate of Return: Males and Females 13.7% (s.e. 3%); Males 14.6% (s.e. 4%); Females 10% (s.e. 8%).

Benefit-cost Ratio: Males and Females 7.3 (s.e. 1.8); Males 10.2 (s.e. 2.9); Females 2.6 (s.e. .73).

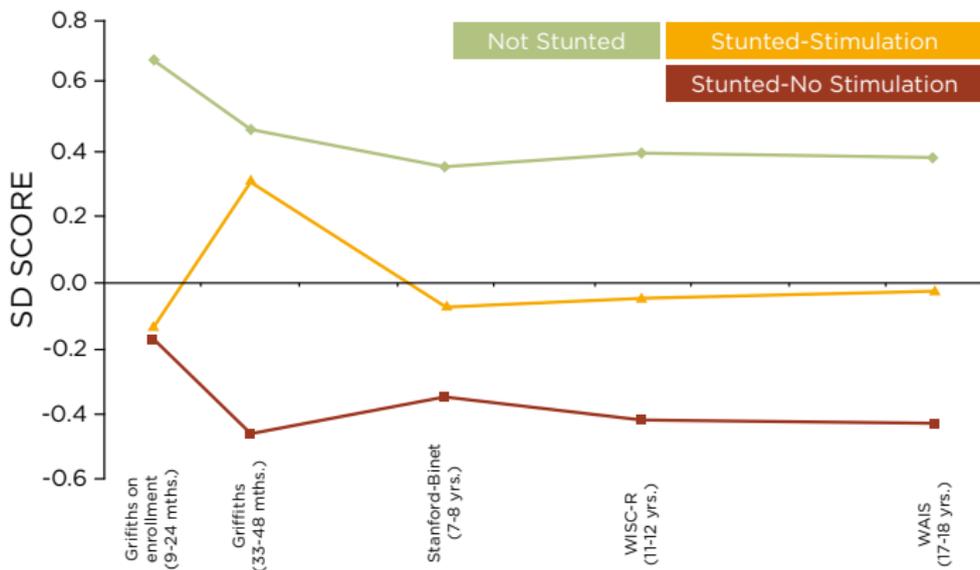
Table 1: Cost/Benefit Analysis of ABC/CARE, Summary

Removed Component	Females			Males			Pooled		
	NPV	IRR	B/C	NPV	IRR	B/C	NPV	IRR	B/C
None	161,759	10.1% (6%)	2.61 (0.73)	919,049	14.7% (4%)	10.19 (2.93)	636,674	13.7% (3%)	7.33 (1.84)
Parental Income	148,854	4% (2%)	1.12 (0.65)	107,907	11% (3%)	9.10 (2.92)	116,953	9% (3%)	6.17 (1.87)
Subject Labor Income	41,908	9% (6%)	2.21 (0.66)	238,105	13% (5%)	7.75 (2.23)	133,032	13% (4%)	6.03 (1.77)
Subject Transfer Income	419	10% (6%)	2.61 (0.73)	-7,265	15% (4%)	10.26 (2.93)	-4,372	14% (3%)	7.38 (1.84)
Subject QALY	42,102	9% (6%)	2.20 (0.69)	106,218	14% (6%)	9.14 (2.73)	87,181	13% (5%)	6.48 (1.79)
Medical Expenditures	-16,037	9% (6%)	2.77 (0.76)	-42,038	15% (3%)	10.61 (2.89)	-31,221	14% (3%)	7.65 (1.85)
Alternative Preschools	16,691	8% (5%)	2.45 (0.73)	13,434	14% (4%)	10.05 (2.92)	14,659	12% (3%)	7.19 (1.84)
Education Costs	1,457	10% (6%)	2.59 (0.72)	-7,852	15% (4%)	10.26 (2.93)	-4,518	14% (3%)	7.37 (1.86)
Crime Costs	31,668	10% (6%)	2.34 (0.62)	638,923	9% (5%)	4.08 (2.18)	450,368	8% (4%)	3.06 (1.01)
Deadweight Loss		18% (12%)	3.83 (1.04)		19% (6%)	15.38 (4.35)		18% (5%)	11.01 (2.79)
0% Discount Rate			5.06 (2.82)			25.45 (10.42)			17.40 (5.90)
7% Discount Rate			1.49 (0.32)			3.78 (0.79)			2.91 (0.59)

Nutritional Programs

The Jamaica Study: Grantham-McGregor et al.

Figure 14: The Jamaica Study: Long-Term Cognitive Benefits



Source: Reproduced with permission from Walker SP, Chang SM, Powell CA, Grantham-McGregor SM. DQ or IQ scores of stunted and non-stunted Jamaican children from age 9-24 months to 17-18. Figure shows long-term deficits associated with stunting and the sustained benefits to stunted children who received a home-visiting programme providing early childhood stimulation. WISC-R=Wechsler Intelligence Scale for Children-revised. WAIS=Wechsler Adult Intelligence Scale. Reproduced with permission from Walker SP, Chang SM, Powell CA, Grantham-McGregor SM. Effects of early childhood psychosocial stimulation and nutritional supplementation on cognition and education in growth-stunted Jamaican children: prospective cohort study. Lancet 2005.

What should we do for the disadvantaged adolescents who do not receive skill-enhancing enriched early environments and have cognitive deficits?

Work Experience and On-the-Job Training

- Learning-by-doing (and sometimes failing) is a major source of learning
- Also learning by imitation

Later Remediation Targeted to the Less Able Is Costly and Often Ineffective

The policies that are effective for adolescents provide mentoring and integrate schooling and work. At the core of effective mentoring is what is at the core of effective parenting: attachment, interaction, and trust. Effective policies focus on developing social and emotional skills, teaching conscientiousness.

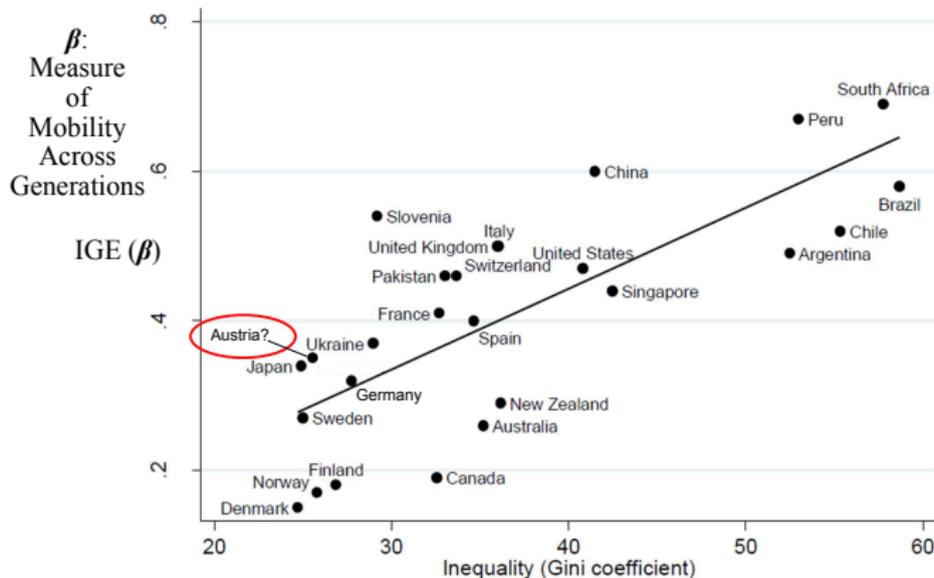
Mentoring can be effective—workplace-based intervention shaping noncognitive skills.

V. Importance of Incentives
A Case Study of Denmark/U.S.

Figure 15: Intergenerational Mobility and Inequality: The Great Gatsby Curve

$$\underbrace{\ln Y_1}_{\text{income of child}} = \alpha + \underbrace{\beta}_{\text{IGE}} \underbrace{\ln Y_0}_{\text{income of parent}} + \varepsilon$$

$\beta \uparrow, \text{ Mobility } \downarrow$

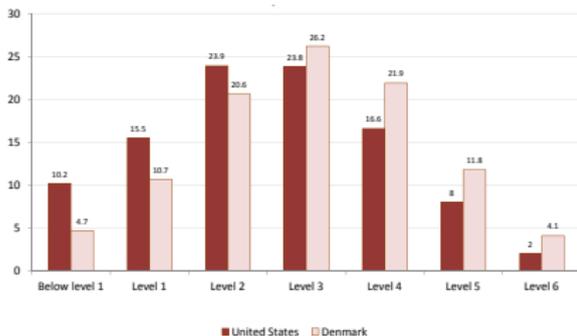


Denmark Spends Generously on Public Education

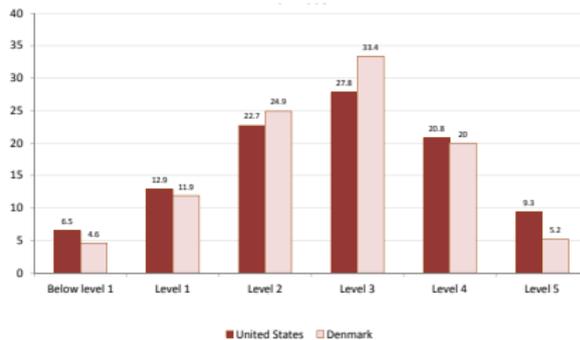
Produces Better Test Score Distributions than U.S.

Figure 16: Percentage of Students at Each Proficiency Level, PISA 2003

(a) Mathematics Scale



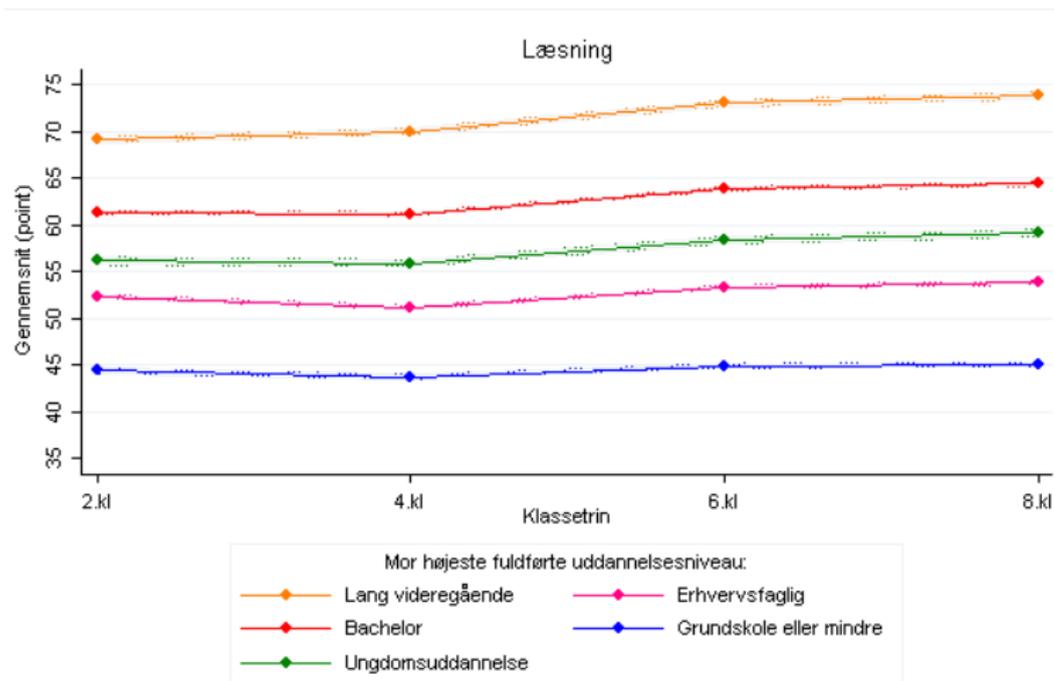
(b) Reading Scale



Source: OECD (2003) Learning for Tomorrow's World, First Results from PISA (2003).

- **Nonetheless, there are steep gradients of children's education in parental education, income, and wealth in both the U.S. & Denmark.**

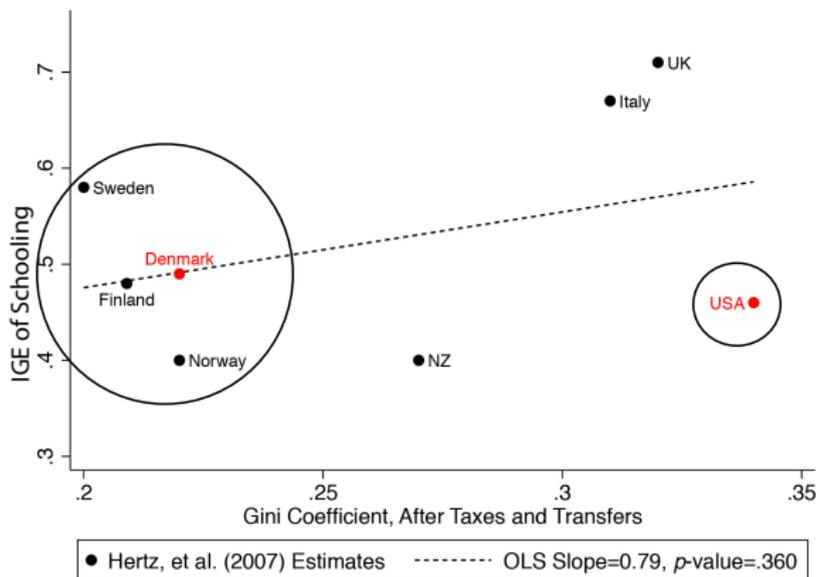
Figure 17: Language Test Scores in Grade 2–8, by Mother's Education



Source: Beuchert & Nandrup (2016).

Figure 18: Intergenerational Educational Mobility and Inequality

$$\underbrace{YOS}_{\text{years of schooling child}} = \alpha + \underbrace{\beta}_{\text{IGE}} \underbrace{YOS}_{\text{years of schooling parents}} + \varepsilon$$



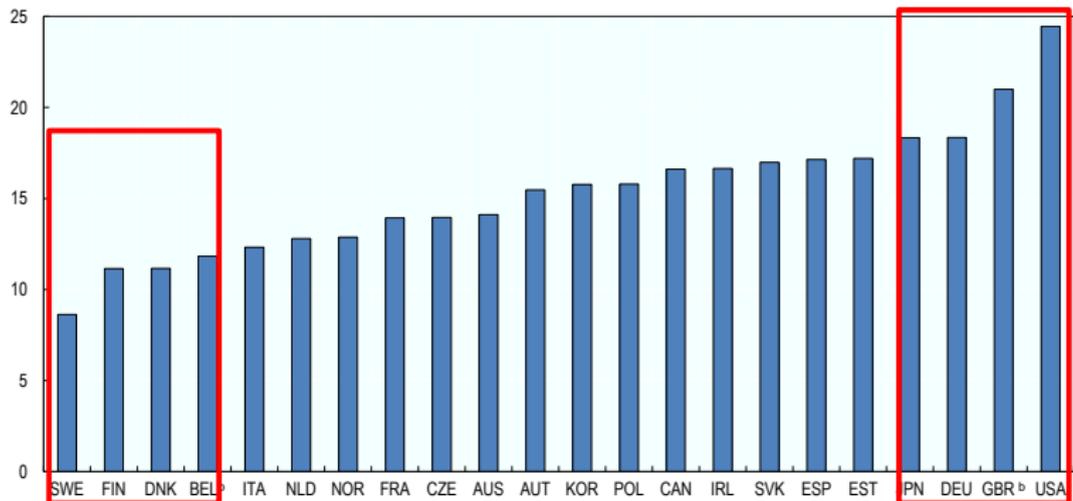
Source: Setzler (2015).

Scandinavia invests heavily in child development and boosts the test scores of the disadvantaged (though not to full equality), but then undoes these beneficial effects by providing weak labor market incentives.



Returns to skills

Percent increase in hourly wages for a standard deviation increase in numeracy



Coefficients on numeracy scores from country-specific OLS regressions of log hourly wages on proficiency scores standardised at the country level



VII. Summary

Efficient Redistribution

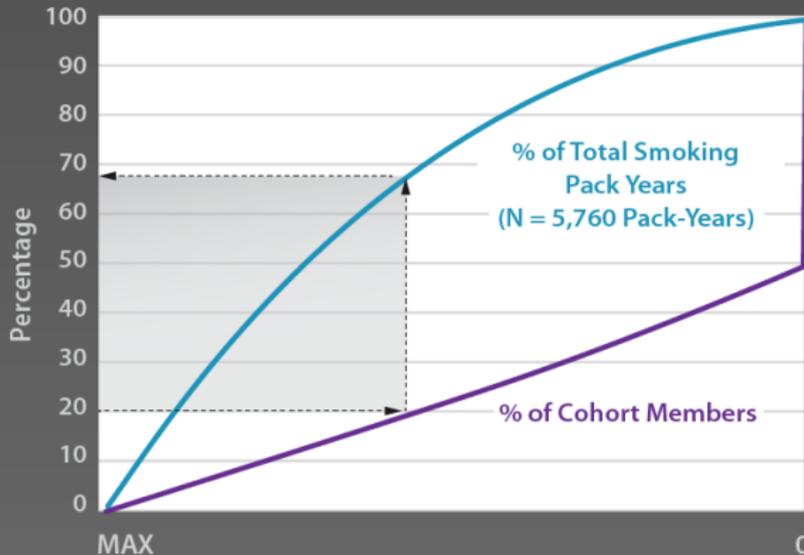
- Skill plays a powerful role in shaping opportunity
- Skills are multiple in nature
- Skills can be boosted through wise social policy
- Early interventions effective
- Incentives matter

- Thank you for your interest and attention and the great honor you have given me today

Additional Caspi et al. Slides

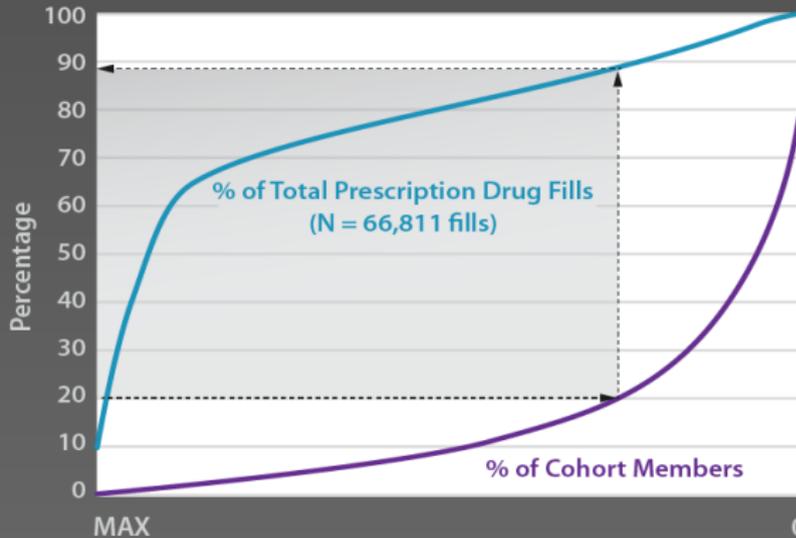
Cigarette Smoking Pack-Years

20% of Cohort Members = 68% of Total Tobacco Smoking Pack-Years



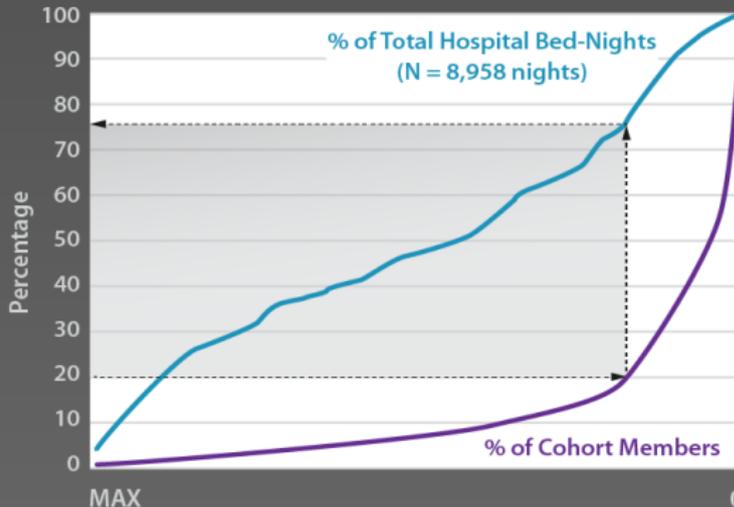
Prescription Drug Fills

20% of Cohort Members = 89% of Total Prescription Drug Fills



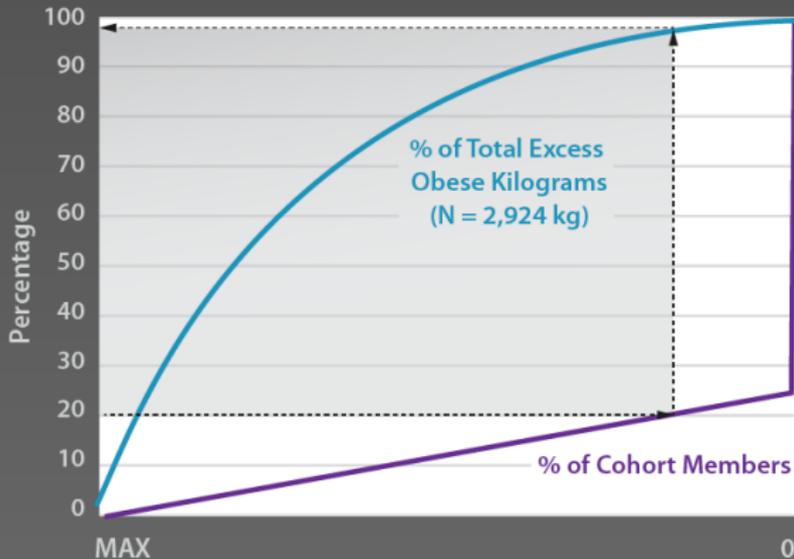
Hospital Bed-nights

20% of Cohort Members = 77% of Total Hospital Bed-Nights



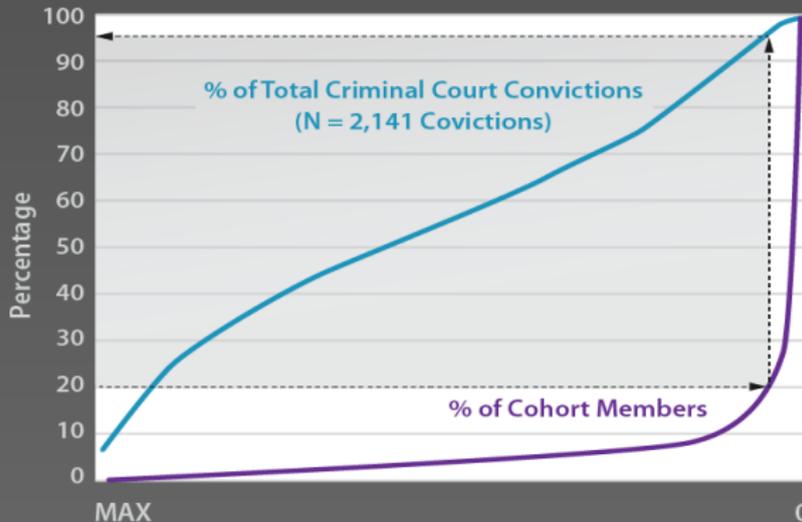
Excess Weight in Kilograms

20% of Cohort Members = 98% of Total Excess Obese Kilograms



Criminal Court Convictions

20% of Cohort Members = 97% of Total Criminal Court Convictions



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