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# The Economics of Inequality and Human Development

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Building a Legal Framework for Public Policies  
for Early Childhood

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Institute for  
New Economic Thinking



Promoting the **capabilities** of people

- Capabilities are the capacities to function in a multitude of life tasks.
- Capabilities are skills.
- They can be acquired.

Avoid Fragmented Solutions.

- The approach I am suggesting not only addresses poverty but also a wide range of social problems such as:
  - i. Crime
  - ii. Teenage pregnancy
  - iii. Health
  - iv. College attendance
- Current policy discussions around the world have a fragmented quality.
- They focus on one problem at a time with policies that are designed to address that one problem, usually by some remediation strategy.

# Examples of Fragmented Solutions

- For crime, hire more police.
- For health, provide more doctors.
- For teenage pregnancy, conduct pregnancy prevention programs.
- To reduce inequality, give cash transfers.

- Today I present a unified approach to policy that addresses these problems using a strategy of human development.
- It will go a long way toward promoting social mobility and productivity and reducing inequality.

- It advocates policies that avoid the conventional tradeoff between equity and efficiency.
- For these policies what is socially fair is also economically efficient.



- **Pre-distribution not redistribution**

- The accident of birth plays a powerful role in determining lifetime opportunities.
- Recent estimates from a variety of sources reveal that conditions determined before age 18 contribute to roughly 50% of lifetime earnings inequality.

# Recent Studies in the Economics of Human Development Establish That:

- A core, low-dimensional set of capabilities predicts and **causes** a variety of diverse socioeconomic outcomes.
- Capabilities are multiple.
- Current public policy discussions focus on enhancing and rewarding cognitive ability as measured by achievement tests.
- However, cognitive skills are only part of what is required for success in life.
- Cognitive and noncognitive—personality—skills are both important causal determinants of life-cycle outcomes with equal strength for many outcomes.
- Biology and health are also important determinants of life-cycle success and life-cycle development.
- Capabilities are not set in stone. There is strong evidence of genetic components, but capabilities evolve and can be shaped in part by investments and environments.

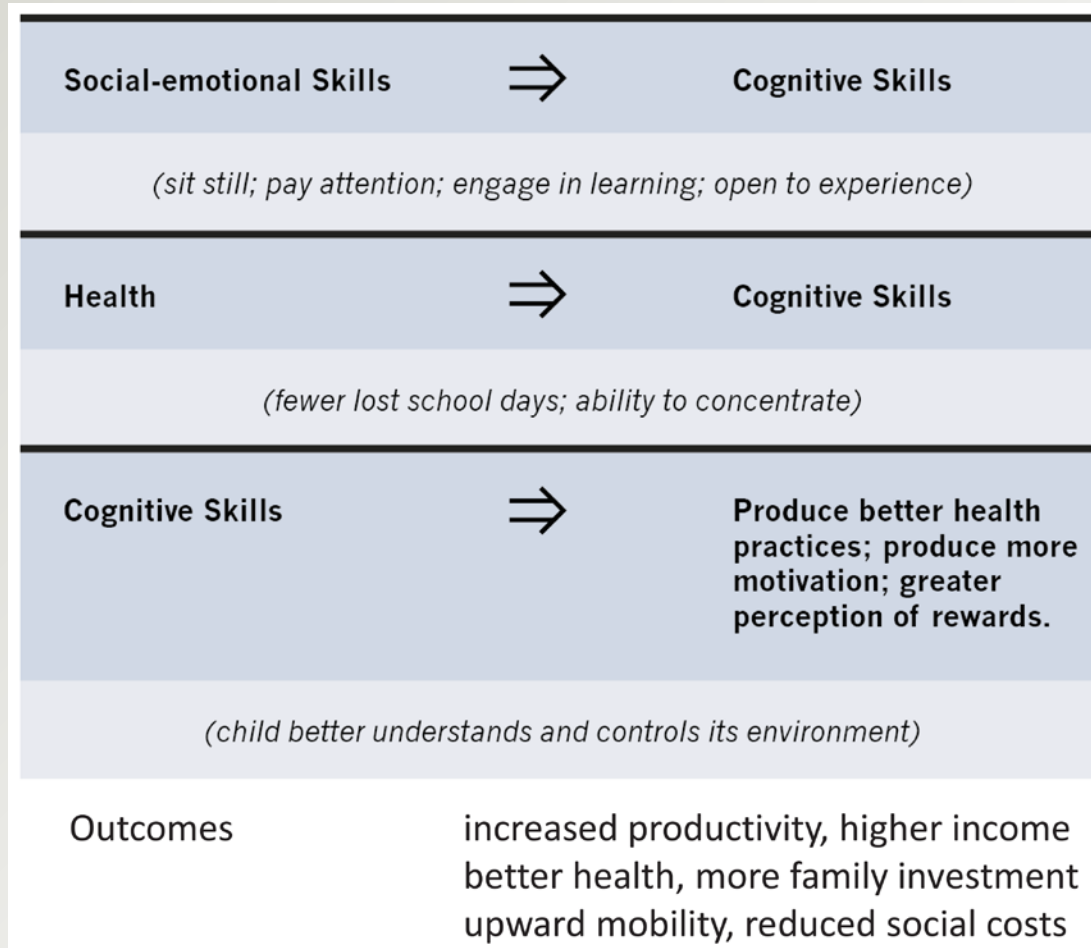
- Gaps in all types of skills between the advantaged and disadvantaged open up early in the lives of children.
- Family environments of young children are major predictors and causes of the attained levels of cognitive and socioemotional skills.
- Family influence extends well beyond transmission of genes.
- The powerful role of family influence is a concern because family environments in many countries around the world including **Brasil** have deteriorated over the past 40 years.
- Both experimental and non-experimental evidence shows that adverse family environments, especially adverse parenting, substantially impair child outcomes.

- Critical and sensitive periods for producing capabilities:
  - Earlier for cognitive capabilities
  - Later for noncognitive capabilities
  - Varies depending on the particular biological (health) capability being studied
- Gaps across socioeconomic groups in both types of capabilities open up early:
  - Persist strongly for cognitive capabilities
  - Less strongly for noncognitive capabilities
  - Widen with age for many biological capabilities

- Many successful interventions to promote skills operate primarily through boosting noncognitive capabilities.
- IQ is barely affected—if at all—by many interventions, especially in successful interventions that target adolescents.
- This is a consequence of the technology of skill formation.
- Life-cycle-stage dependence of the efficacy of investment.

# Technology of Skill Formation

# Skills Enhance Each Other: Technology of Skill Formation





# Evidence from the Technology of Skill Formation

# The Importance of Cognitive and Soft Skills

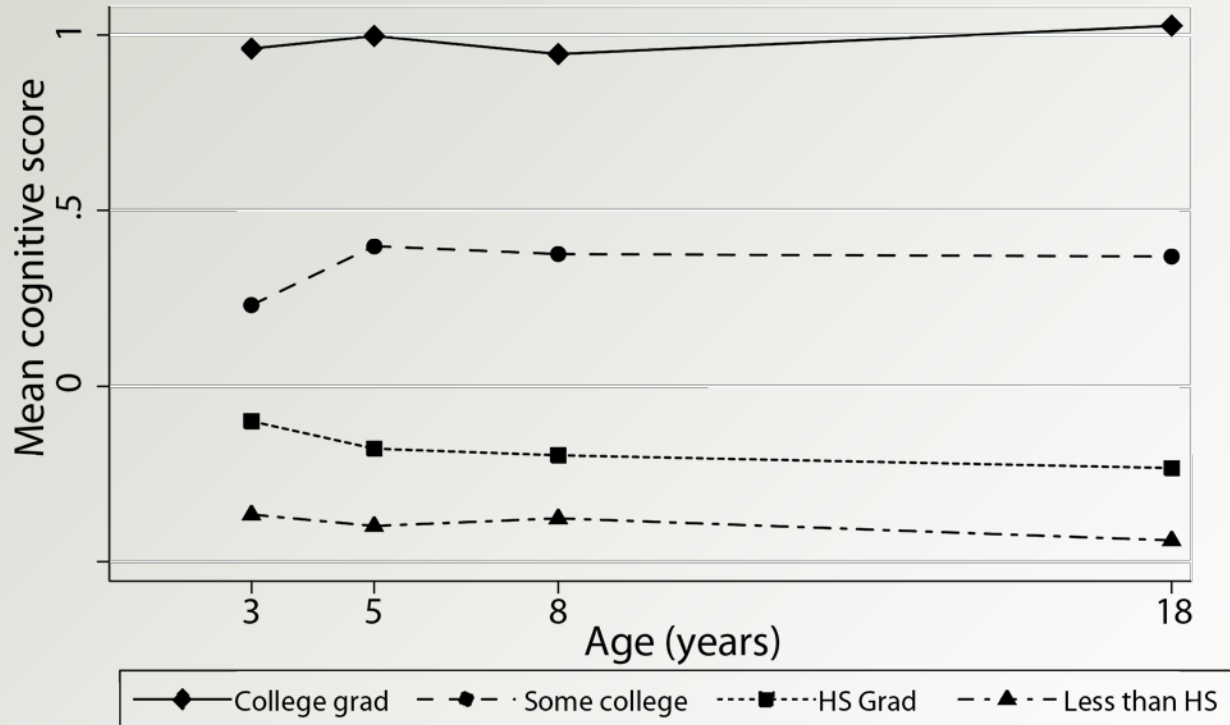
- Recent studies have advanced our understanding of which skills matter for success in life.
- While cognitive skills are important, so are personality and social skills.

- Equally important in explaining:
  - i. Crime
  - ii. Teenage pregnancy
  - iii. College attendance and graduation
  - iv. Wages

# Gaps Open Up Early

- Gaps in important abilities open up early across socioeconomic groups.

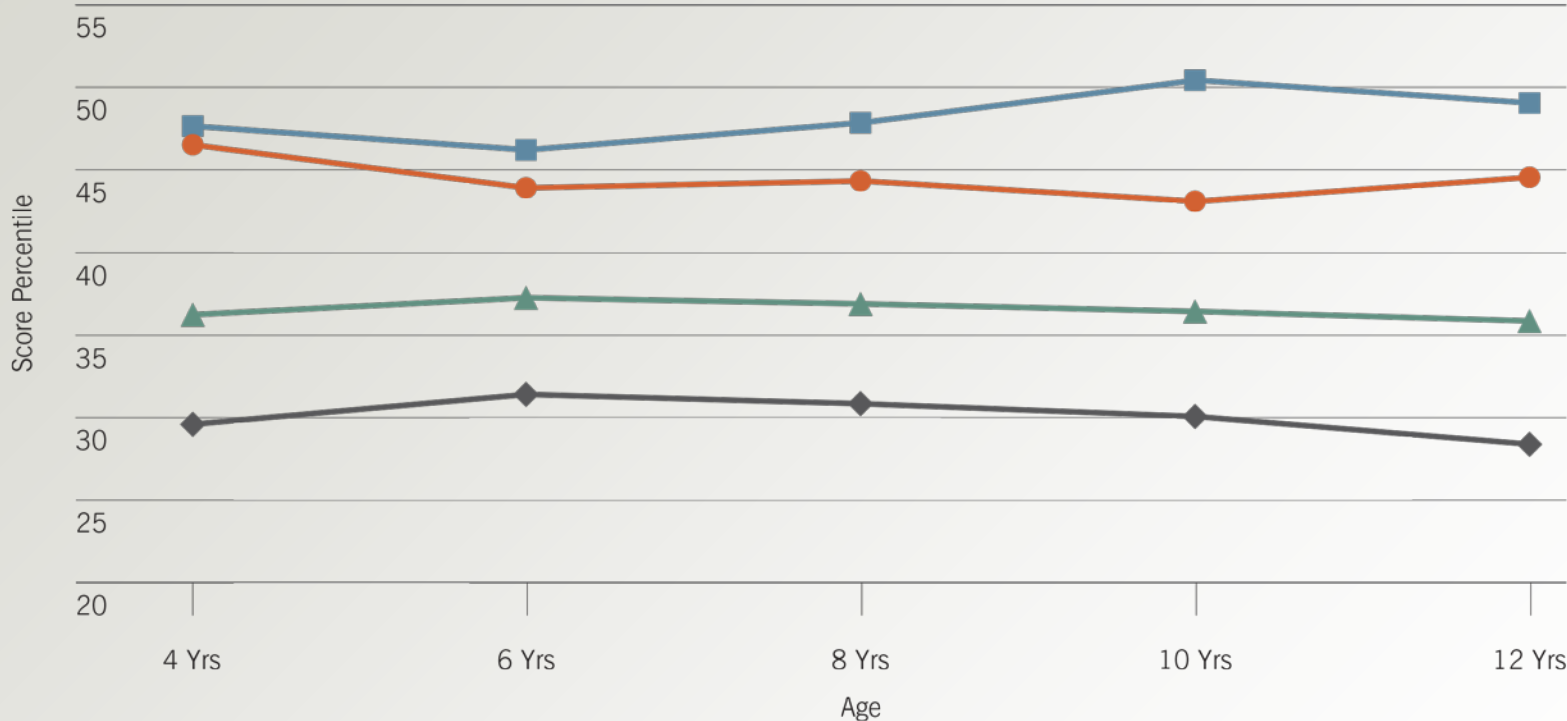
# Trend in cognitive scores by age by maternal education



Each score standardized within observed sample. Using all observations and assuming data missing at random. Source: Brooks-Gunn et al. (2006).

# Average percentile rank on anti-social behavior score, by income quartile

(The higher the score, the worse are behavioral problems)



- Lowest Income Quartile
- Second Income Quartile
- ▲ Third Income Quartile
- ◆ Highest Income Quartile

- Which aspects of families are responsible for producing these gaps?
- Is it due to genes?
- Family environments?
- Social environments?
- Parenting and family investment decisions?

# Family Environments

- In the U.S. and many other countries where it has been documented, a divide is opening up between the advantaged and the disadvantaged in the quality of early family environments.
- Those born into disadvantaged environments are receiving relatively less stimulation, child development resources, and access to health care than those from advantaged families.
- Fosters persistence of inequality across generations.



- Family environments shape child development.

# Hart & Risley, 1995

Children enter school with "meaningful differences" in vocabulary knowledge.

## Emergence of the Problem

In a typical hour, the average child hears:

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

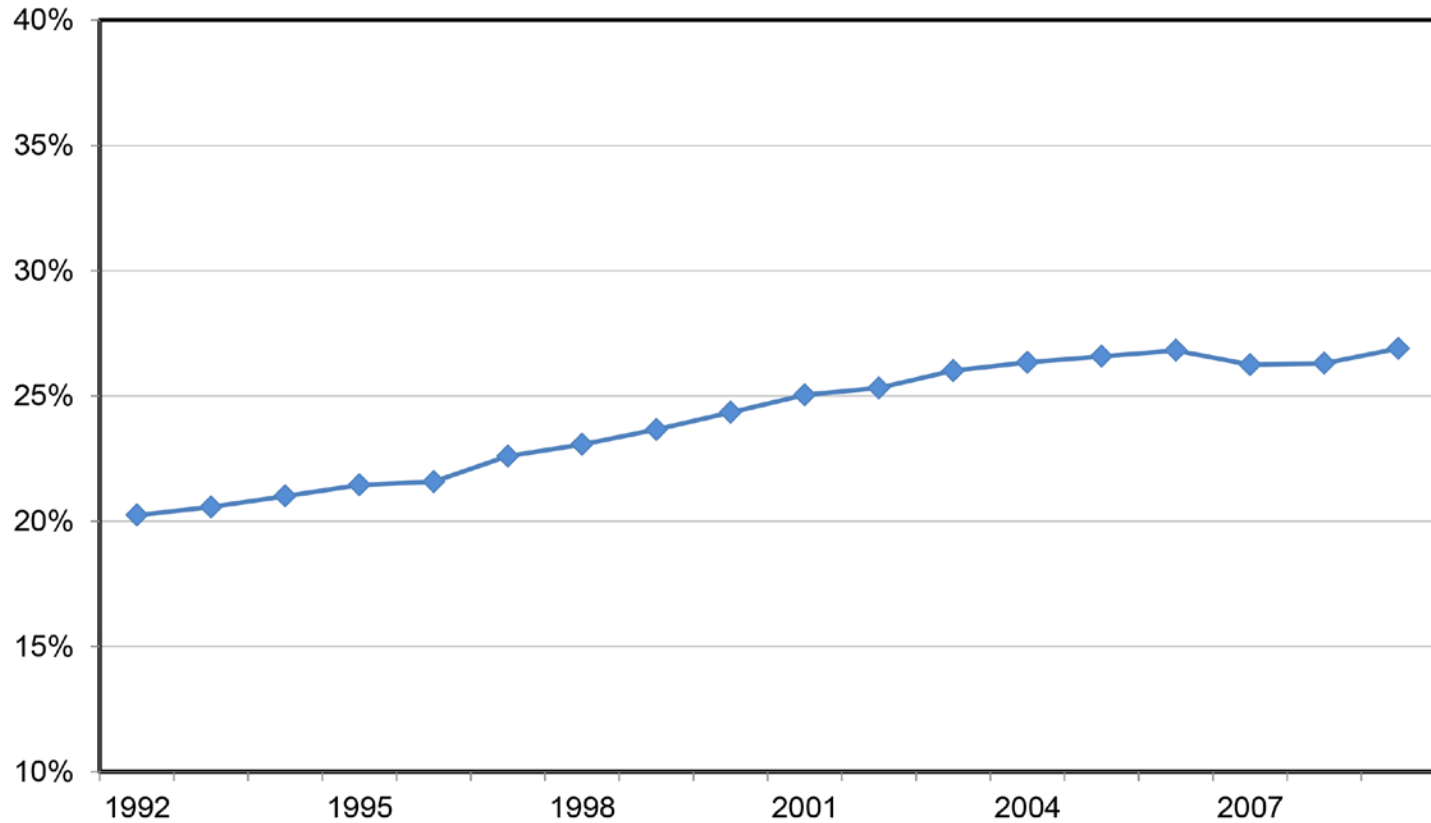
# Hart & Risley, 1995

## Meaningful Differences

***By the time the children were 3 years old,*** parents in less economically favored circumstances had said fewer different words in their cumulative monthly vocabularies than the children in the most economically advantaged families in the same period of time.

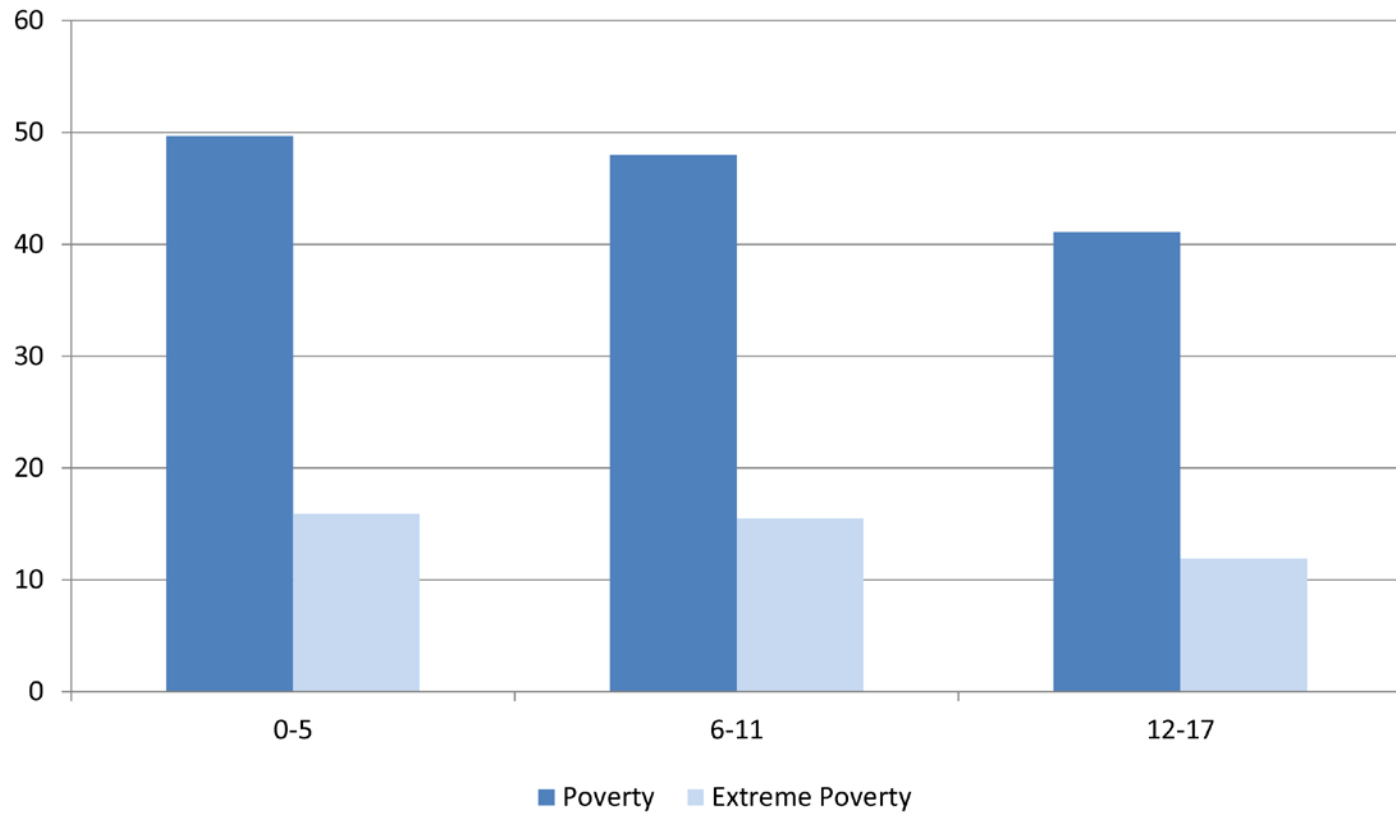
<b>Cumulative Vocabulary</b>	
Children from welfare families:	500 words
Children from working class families:	700 words
Children from professional families:	1,100 words

## Share of Sole Mother Families with Children Out of All Families with Children, Brazil



Source: IBGE

## Proportion of Children Living in Poverty and Extreme Poverty, Brazil 2007

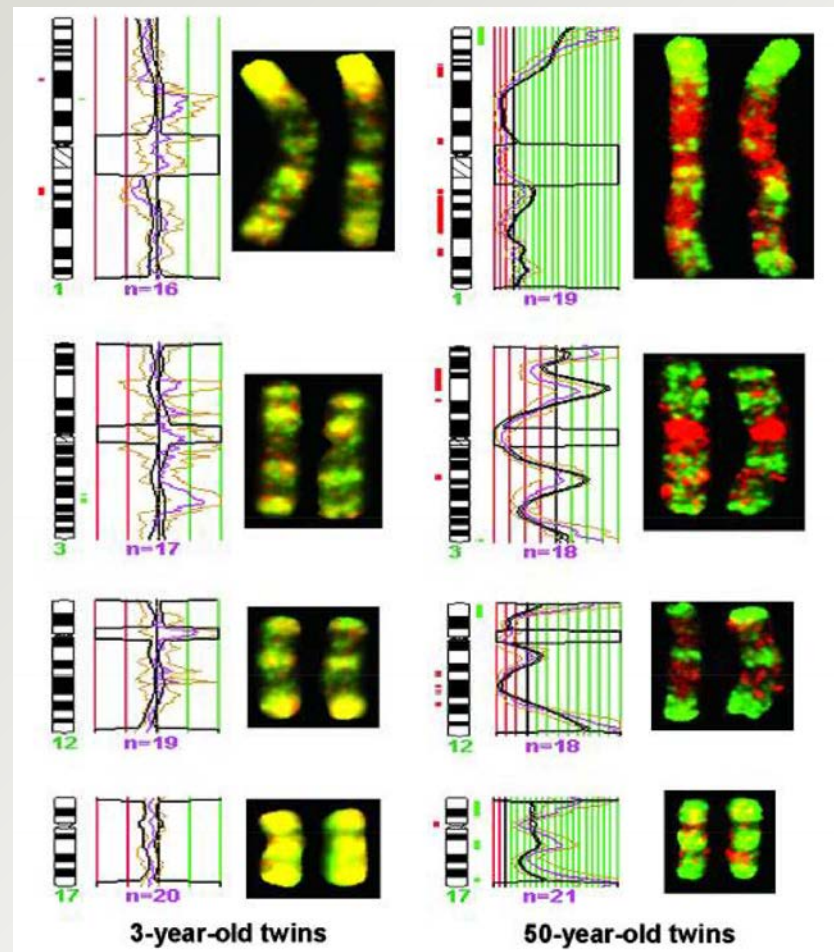


Source: CEPAL-UNICEF

**Adversity Gets Under the Skin.**

**Evidence on gene-environment interactions**

# DNA methylation and histone acetylation patterns in young and old twins

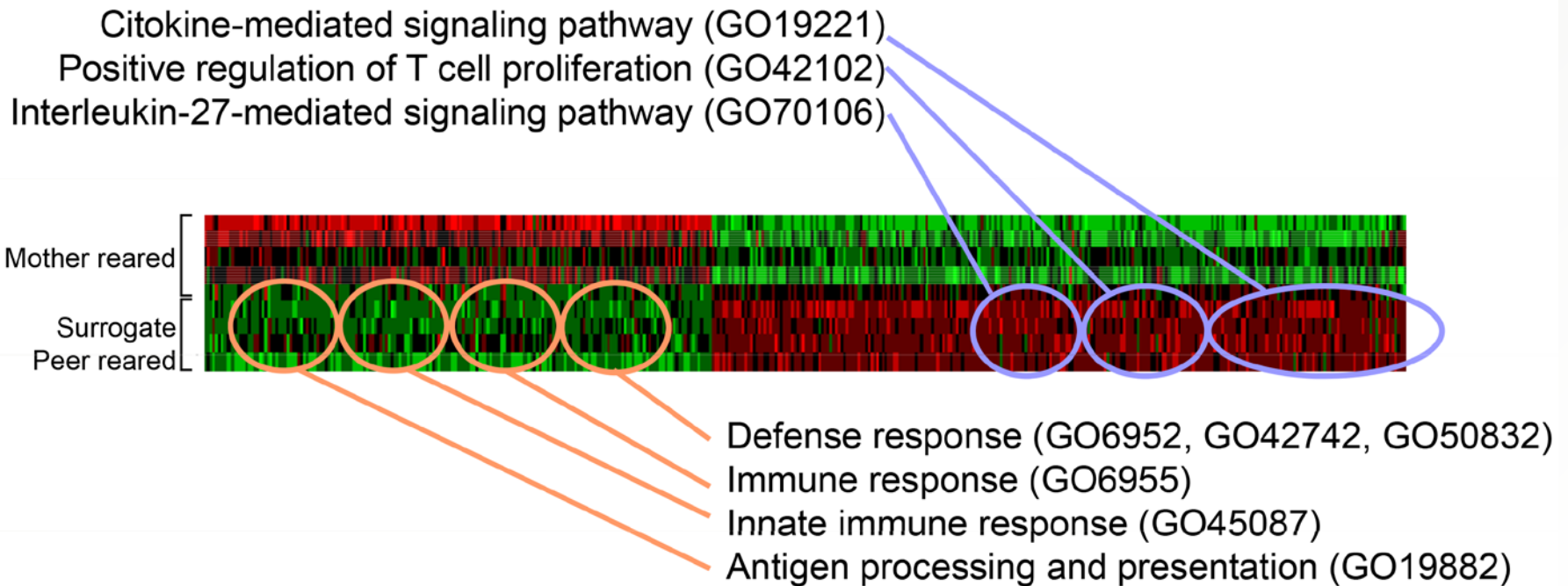


Source: Fraga, Ballestar et al. (2005)

# Early Life Experiences Change The Way Genes Express Themselves

## Up- and Down-Regulated Genes in Rhesus Monkeys

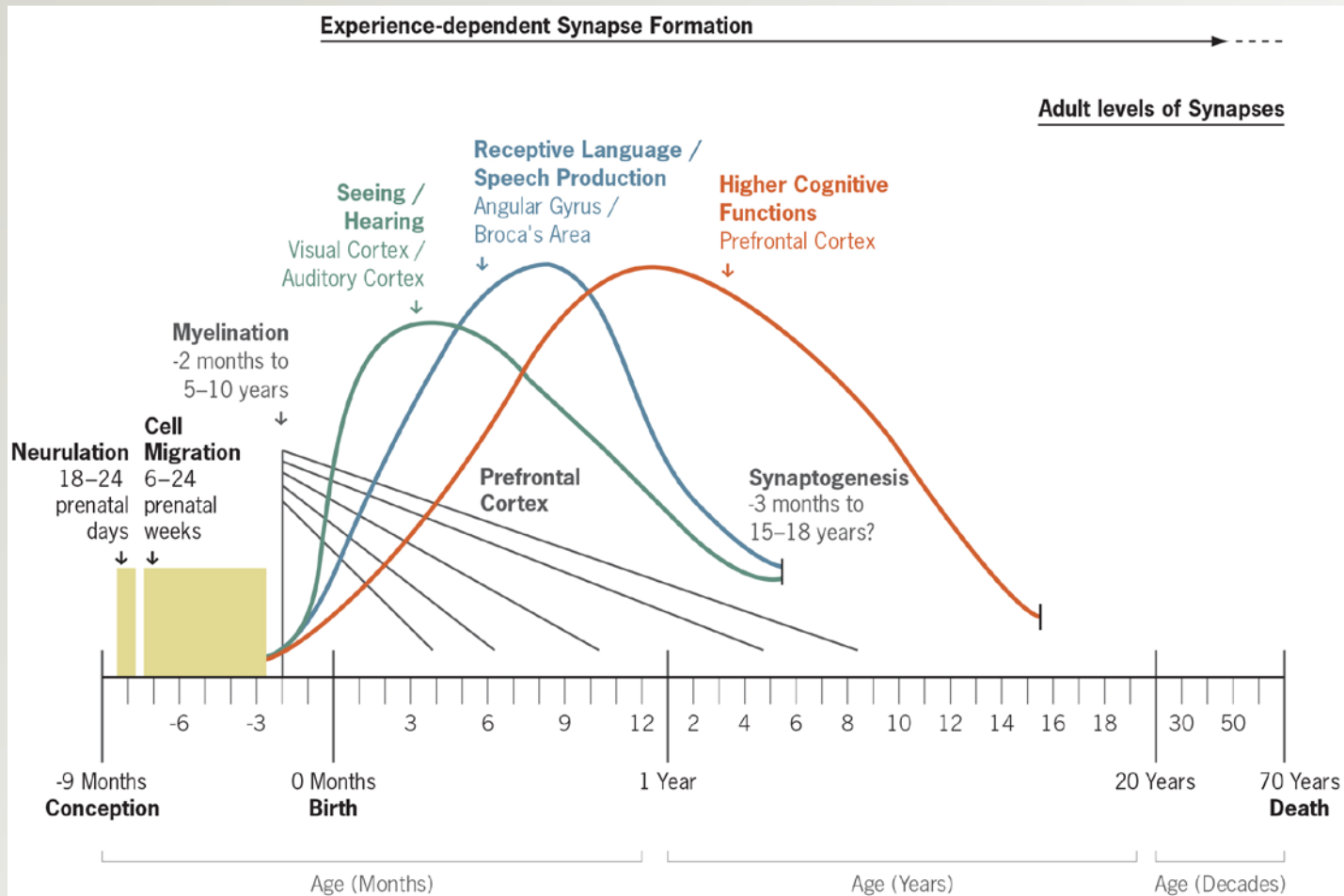
### Differential gene expression (GO annotations, biological functions), SPR vs. MR monkeys



Source: Cole, Conti, Heckman and Suomi (2012)



# Human Brain Development



Source: Thompson and Nelson (2001)

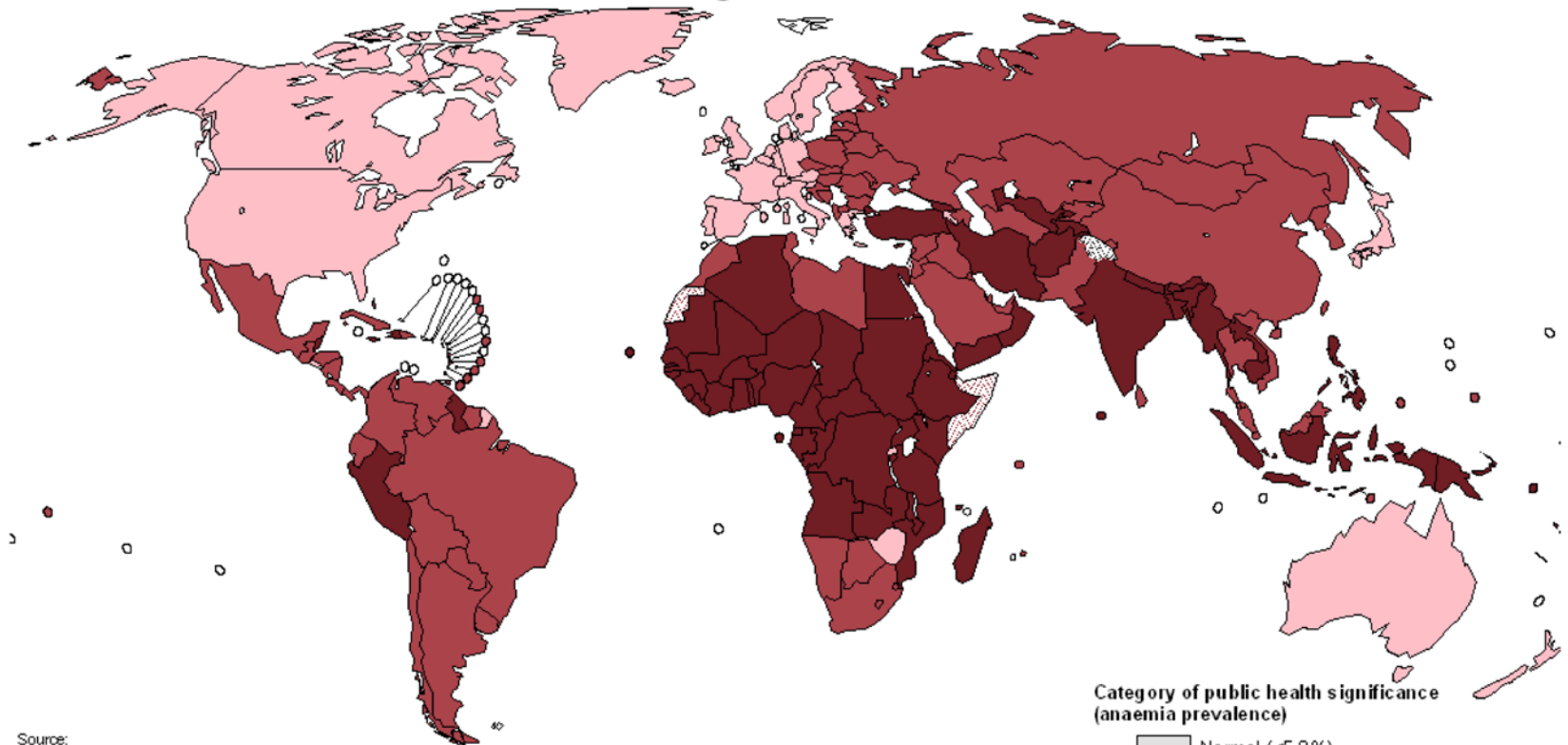
# Nutrition: Nutrition as an investment

- Malnutrition in pregnancy affects the capacities of the child.
- Vitamin A deficiencies (blindness)
- Iron deficiencies—IQ
- Malnutrition in early childhood has effects on the ability to learn and to concentrate.
- While the problem of malnutrition is more widespread in developing countries, it is present in developed and middle income countries as well.



Micronutrient Malnutrition Unit  
Nutrition for Health and Development

## Anaemia as a public health problem by country: Pregnant women



Source:  
de Benoist B et al., eds. Worldwide prevalence of anaemia 1993-2005.  
WHO Global Database on Anaemia. Geneva, World Health Organization, 2008

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

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# Severity of Vitamin A deficiency



# Key Policy Issue

- What is the optimal time of intervention for promoting different capacities?

# **Enriched Early Environments Can Compensate In Part For Risk Features of Disadvantaged Environments**

# Early Intervention Programs for Disadvantaged Children

## The Perry Program

- The Perry Program is the best studied of all early childhood intervention programs.
- Children targeted to be low IQ ( $\leq 80$ ).
- An experiment with follow up through age 40.

- The program focused on developing planning, execution and social skills. Plan-Do-Review.
- The control and treatment groups have been followed through age 40.



- Perry did **not** raise IQ of participants in a lasting way.
- It boosted personality skills.
- It has a rate of return of 7–10% per annum—above the long-term return to equity on U.S. stock market.

- The Perry Preschool Program worked primarily through improved socioemotional channels.

# Carolina Abecedarian Study :

## Overview

### ABC Project

- **Where:** Conducted in Chapel Hill, North Carolina
- **When:** The mid 1970s - the early 1980s
- **Who:** Children born to high risk mothers, mostly African- Americans (with some Whites), recruited during pregnancy.

# Carolina Abecedarian Study :

## Overview

- **What:**

1. Fulltime Daycare (8 hours/day, 5 days/wk, 50 weeks/yr) for 5 years at age 0-5. Gave cognitive stimulation and training in self-control and social skills.
2. Full-day need-based, individualized tutoring + bi-weekly home visits for 3 years at age 6-8, but not during early childhood.
3. Gave health checkups to the children in the program.

# Carolina Abecedarian Study : Results

- Lasting IQ effect
- Improved parenting practices and child attachment
- Positive effect on female behavior and mental health
- Higher educational attainment
- Higher employment rate
- Reduced criminal activity
- Better child and adult health

## Abecedarian Intervention, Health Effects at Age 35

	Treatment Mean	Control Mean	Treatment <i>p</i> -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 (2012).

# Early Intervention Programs for Disadvantaged Children

## Nurse Family Partnership

- NFP is a **prenatal** and early childhood intervention through age 2 that consists of nurses home visitation and combines prenatal care, parenting education and family planning components.
- It targets economically disadvantaged families.
- The target population consists of first time mothers considered at risk if they are poor, unmarried or young.

# Jamaican Intervention:

(Gertler, Grantham-McGregor, Walker, Pinto et al., 2013)

- Long-term (several waves up to 22 years old) follow up of cognitive and socioemotional stimulation and supplementation.
- Randomized trial on 129 stunted kids in Jamaica:
  - Stimulation consisted of weekly home visits and involved mother and children, taught mother how to stimulate child intellectually and emotionally.
  - Nutritional supplementation by formula.



# **Jamaican Intervention: (Grantham McGregor, Walker et al.)**

- Short-term impact of both nutrition and stimulation, additive effect.
- But long-term fade out of nutrition program. However, long-term persisting effect of stimulation.

# Jamaican Intervention: (Grantham McGregor, Walker et al.)

- Consistent long-term impact of stimulation on
  - Education
  - Self-control and social behavior
  - Earnings and employment at 22 years old
  - Cognitive skills

# Traditional Methods of Later Remediation are Often Costly and Often Ineffective

- As **currently implemented**, many adolescent remediation efforts to boost skills targeted toward the disadvantaged have returns that are low compared to early childhood programs targeted towards disadvantaged populations.

For example:

1. Class size reductions (reducing class size by five pupils per classroom)
2. Adult literacy programs
3. Public job training programs
4. Tuition reduction policy

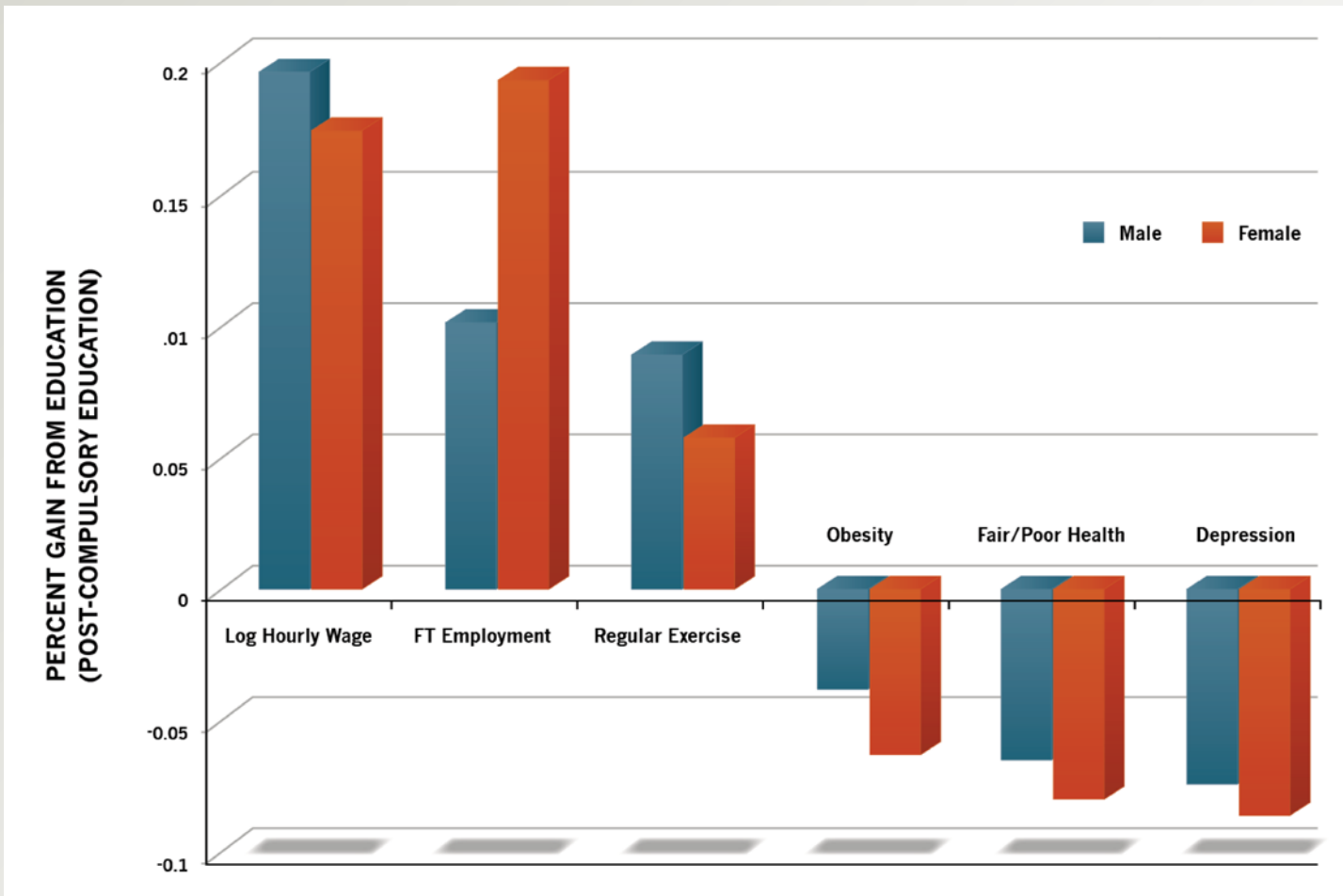
- However, motivational programs—programs that build social skills and promote social behavior—are effective in the adolescent years.
- Apprenticeships and workplace-based educational programs that focus on the same key ingredients of attachment, personality, discipline, and self control, as emphasized in early childhood programs, are effective.

# Attachment

- Good parenting and good adolescent mentoring is based on good attachment relationships.
- One on one advice, support, and scaffolding to support children.
- Conscientiousness and consistency are important features of any successful parenting—mentoring—teaching relationship.
- Attachment and support are more important for human development than monetary or material resources per se.
- The proper measure of childhood poverty is not money income per se but absence of attachment, consistency and psychological support.

# What about promoting education?

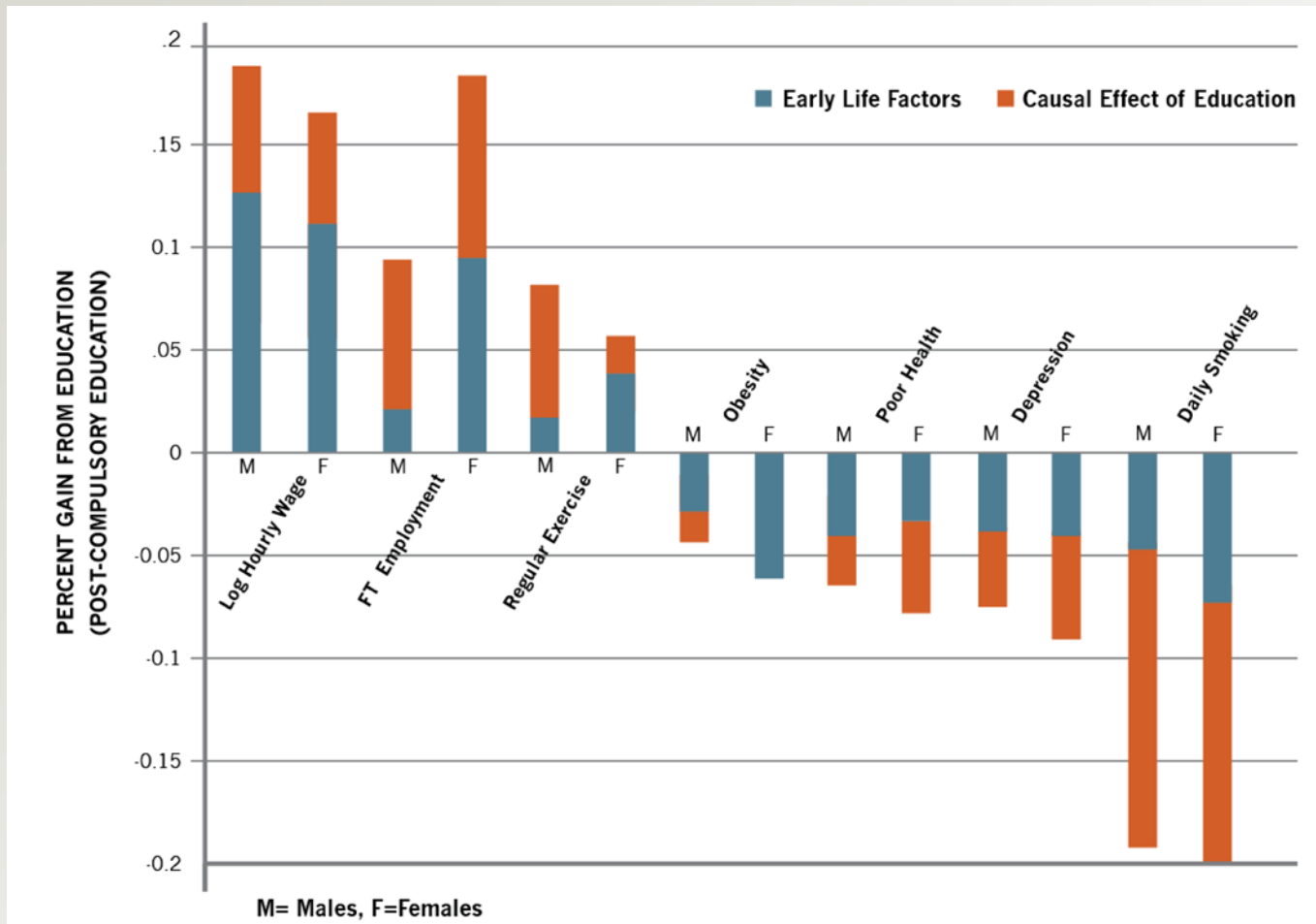
# Disparities by Education (Post-compulsory Education)



Note: Conti and Heckman (2010). Author's calculations using BCS70.

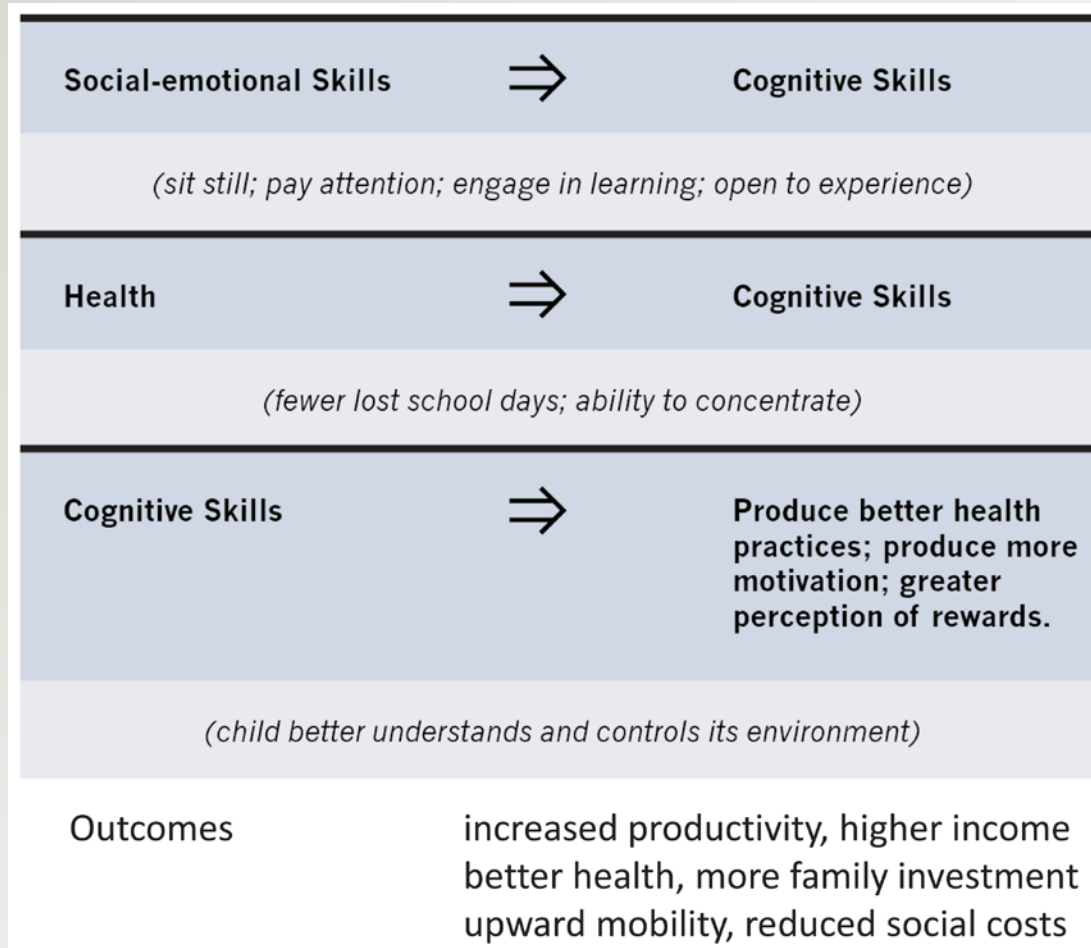


# Disparities by Education (Post-compulsory Education)



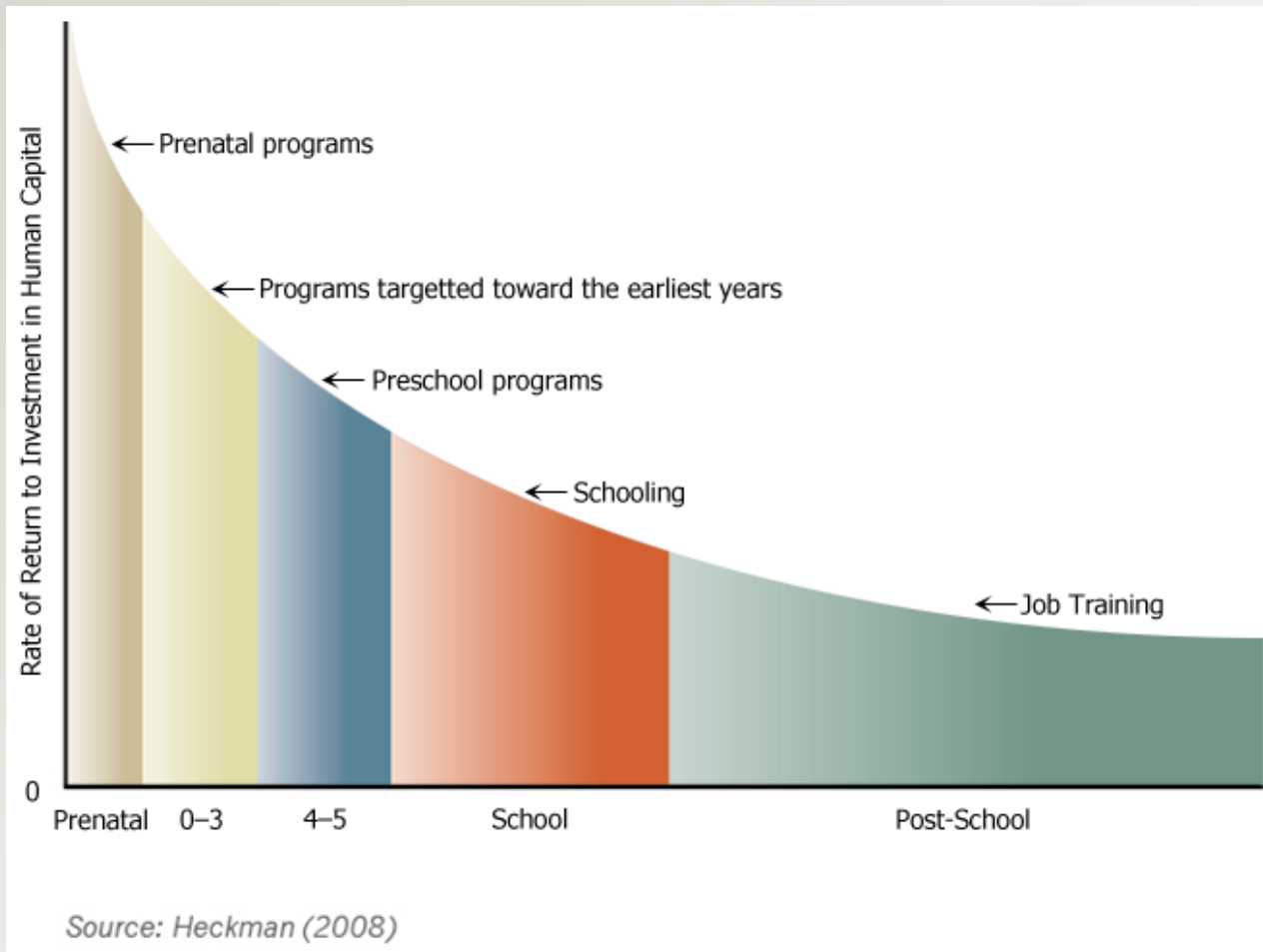
Note: Conti and Heckman (2010). Author's calculations using BCS70.

# Skills Enhance Each Other: Technology of Skill Formation



**Prevention, not remediation.**

# Returns to a Unit Real Invested



Source: Heckman (2008).

# Summary

- The proper measurement of disadvantage is the **quality of parenting, attachment, consistency and supervision, not income per se.**

- Social policy should be redirected toward the malleable early years, if we want to successfully reduce inequality and promote productivity in society by producing effective people.

# Appendix



# The Argument

1. Modern society is based on skills.
2. Low levels of skill are major predictors and causal determinants of major social problems (dropping out of school, crime, teenage pregnancy, obesity, and poor health).

3. Socioemotional abilities, ``soft skills," physical and mental health, perseverance, attention, motivation, and self confidence are also important and are often neglected.
4. So are health and mental health skills.
5. They contribute to performance in society at large and even help determine scores on the very tests that are currently used to monitor cognitive achievement (e.g., PISA).

6. Gaps in all types of skills between the advantaged and disadvantaged open up early in the lives of children.
7. Family environments of young children are major predictors of cognitive and socioemotional skills, as well as crime, health and obesity.
8. Family influence extends well beyond the transmission of genes.
9. The powerful role of early family influence is a concern because family environments in many countries around the world have deteriorated over the past 40 years.
10. Experimental evidence on the effectiveness of early interventions in disadvantaged families is consistent with a large body of non-experimental evidence that adverse family environments, especially adverse parenting, substantially impair child outcomes.

11. If society intervenes early enough, it can raise cognitive and socioemotional capabilities and the health of disadvantaged children.
12. Through multiple channels, these effects percolate across the life cycle and across generations.
13. Adolescent interventions suitably targeted toward promoting personality skills can also be effective.

14. Early interventions reduce inequality by promoting schooling, reducing crime, and reducing teenage pregnancy.

15. They also foster workforce productivity.

16. They promote health and health-improving behaviors.

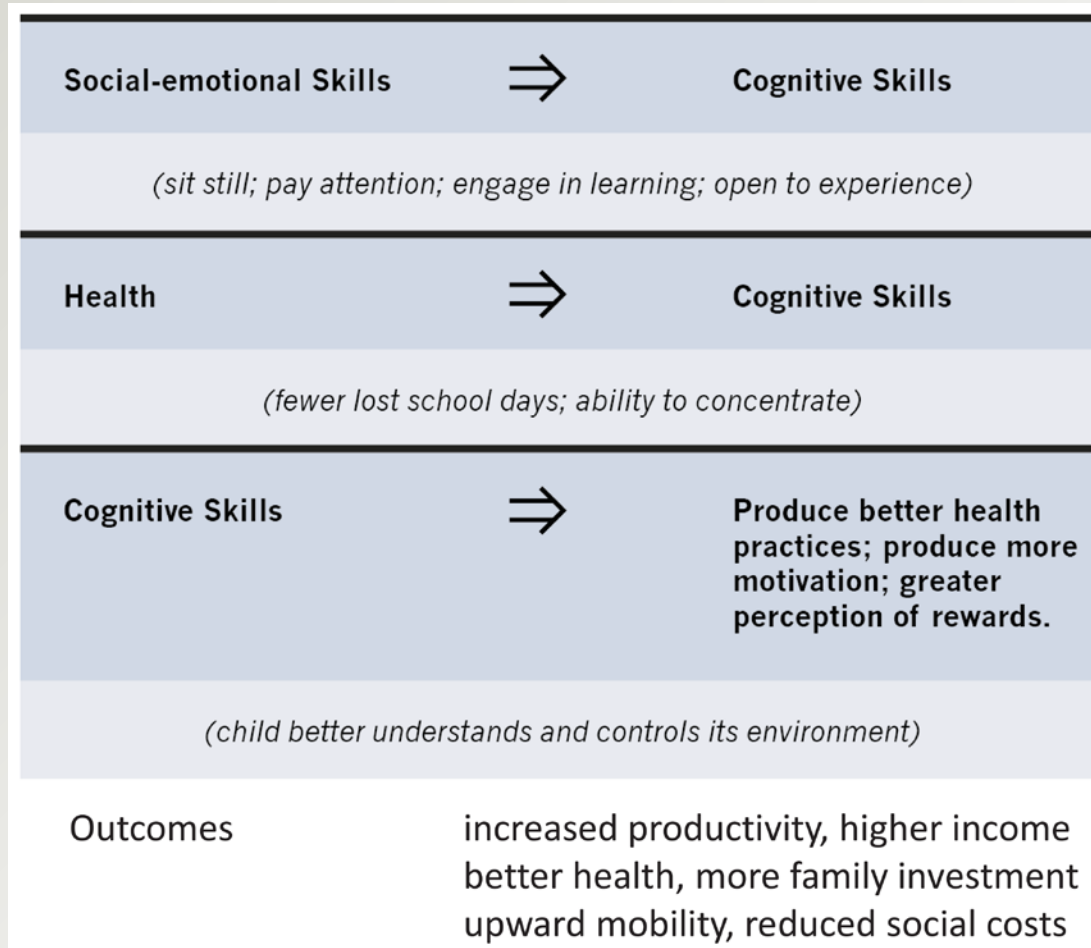
17. These interventions have high benefit-cost ratios and rates of return. They pass efficiency criteria that any social program should be asked to pass.

18. As a rule, early interventions have much higher economic and social returns than traditional later life interventions much discussed in the literature such as reduced pupil-teacher ratios, public job training, convict rehabilitation programs, adult literacy programs, tuition subsidies or expenditure on police.
19. This greater return arises because of the greater malleability of the young child as captured by the technology of skill formation.

20. Life cycle skill formation is dynamic in nature. Skill begets skill; motivation begets motivation. If a child is not motivated and stimulated to learn and engage early in life, the more likely it is that when the child becomes an adult, it will fail in social and economic life.



# Skills Enhance Each Other: Technology of Skill Formation

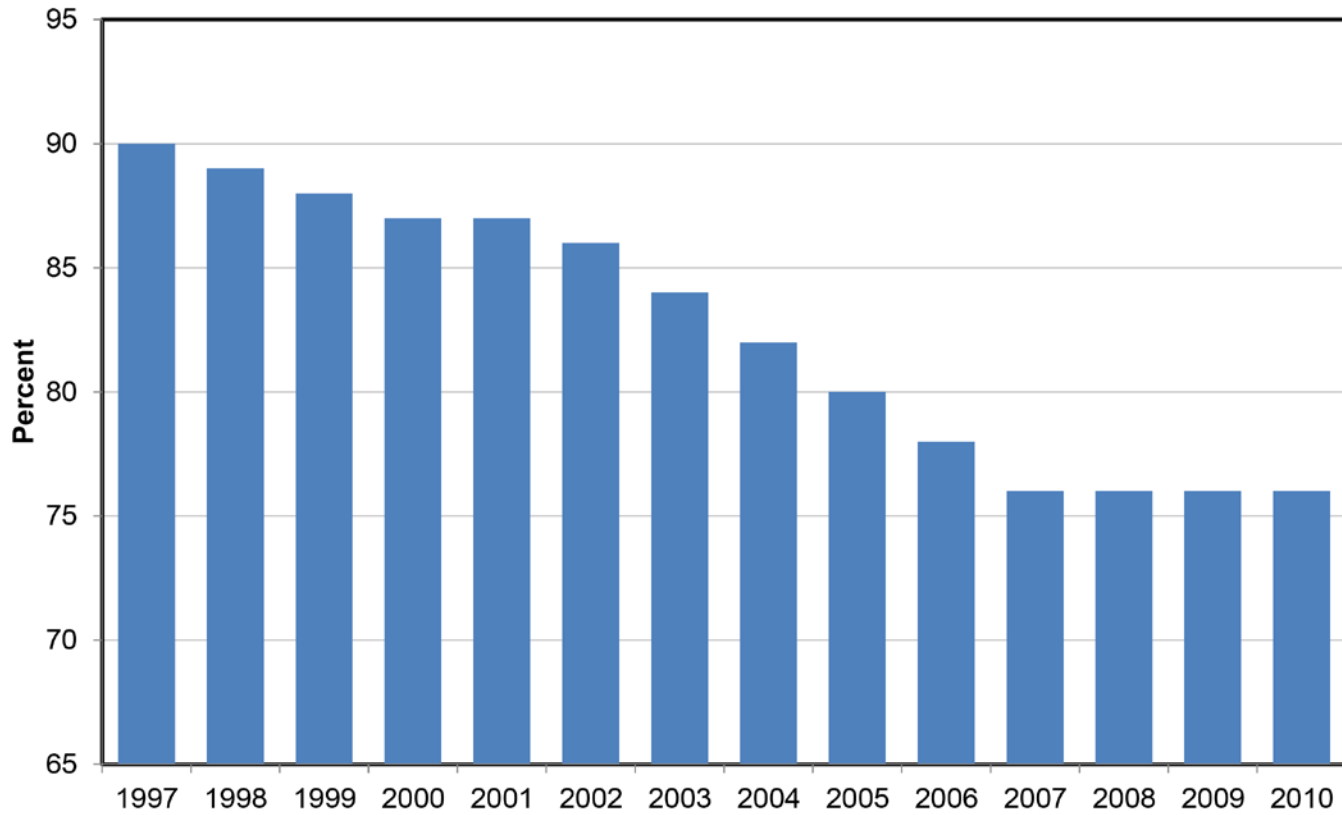


21. The longer society waits to intervene in the life cycle of a disadvantaged child, the more costly it is to remediate disadvantage. Similar dynamics appear to be at work in creating child health and mental health.
22. If we attempt remediation in adolescents, we should focus primarily on the more malleable non-cognitive skills - personality skills.

23. A major refocus of policy is required to incorporate modern understanding of the life cycle dynamics of skill and health formation and the importance of the early years in creating inequality and opportunity, and in producing skills for the workforce and the larger society.

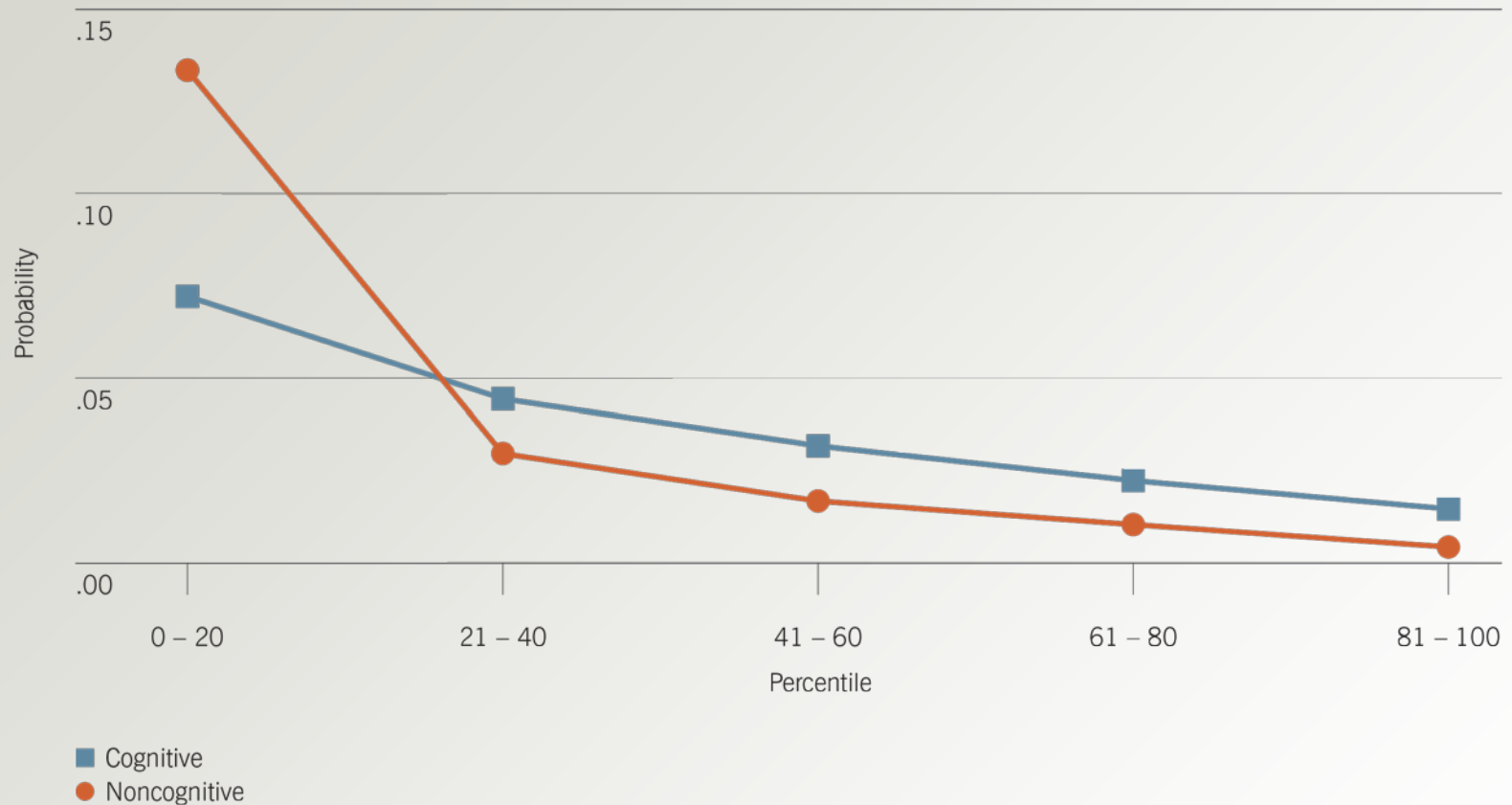
- 24. Although schools and schooling are important, effective social policy targets and strengthens the family.
- 25. The family is under challenge around the world.
- 26. Successful families produce successful children.
- 27. Successful interventions mimic successful families and work to bolster the resources and the capabilities of the family.

## Adolescent Birth Rate (15-19) Per 1000 Women, Brazil



Source: World Bank

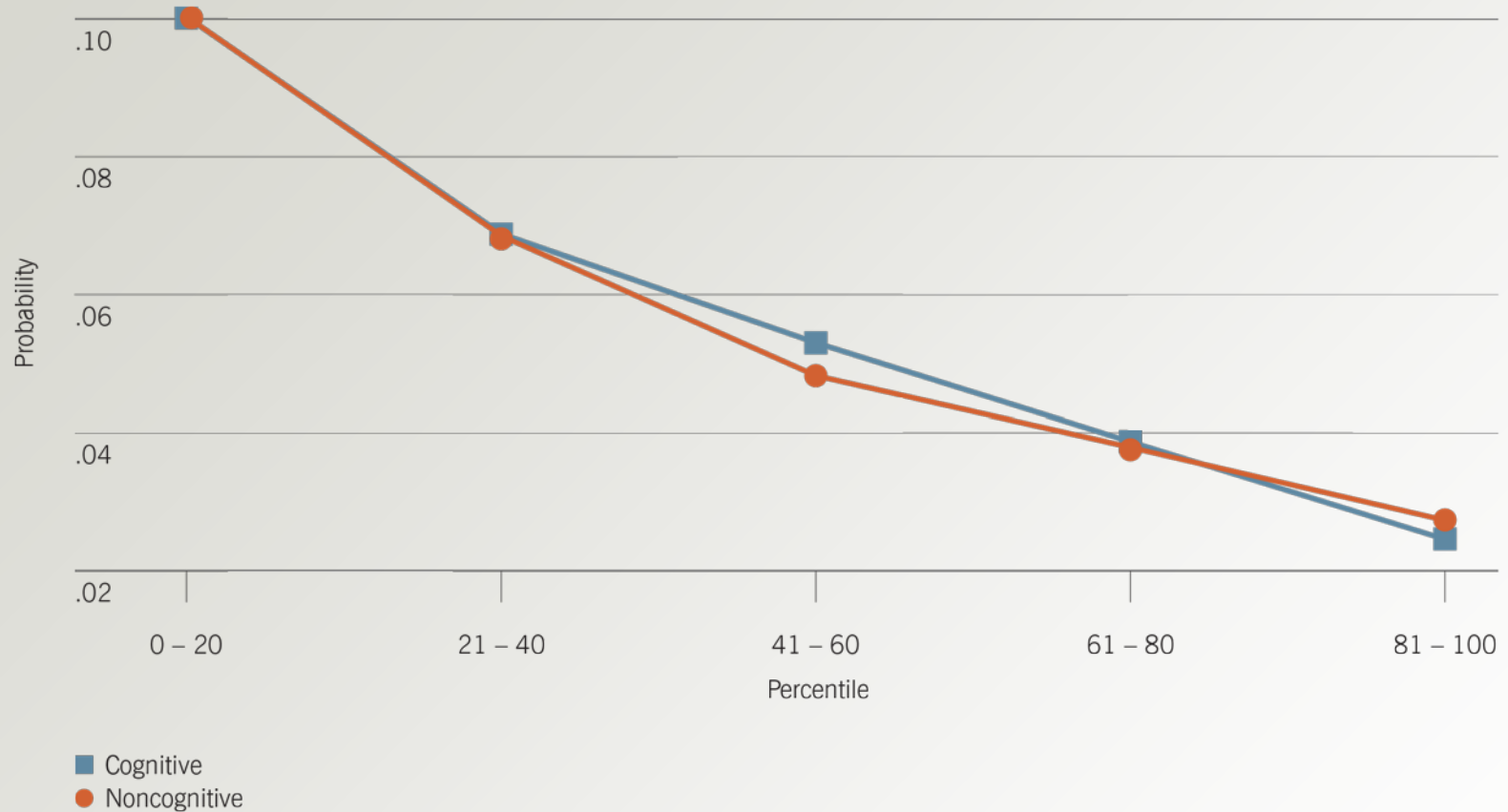
# Ever been in jail by age 30, by ability (males)



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating the cognitive ability.

Source: Heckman, Stixrud, and Urzua (2006).

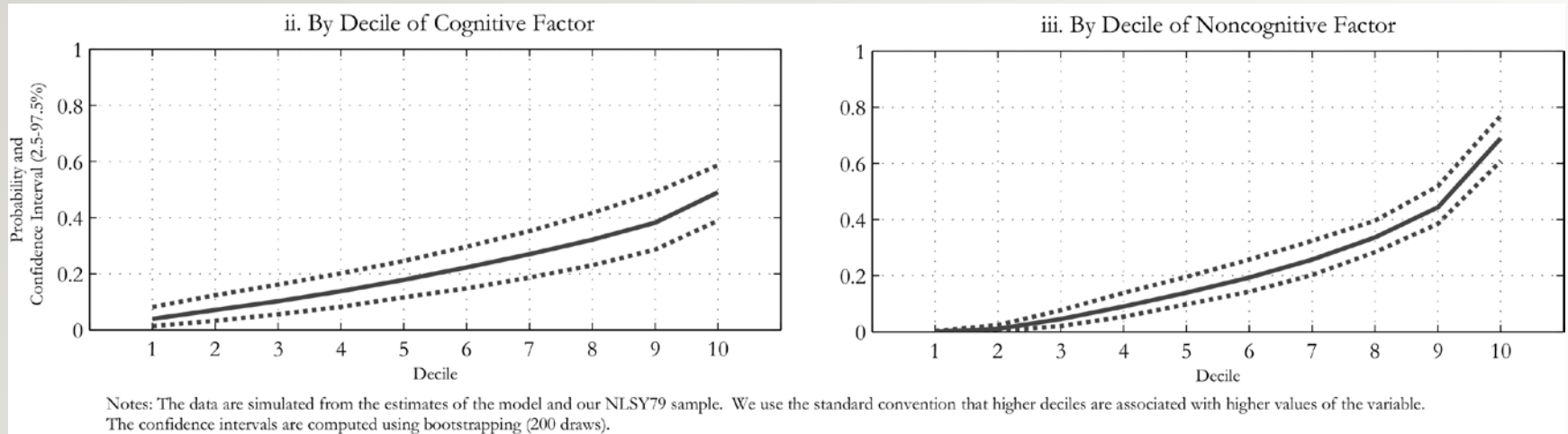
# Probability of being single with children (females)



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating the cognitive ability.

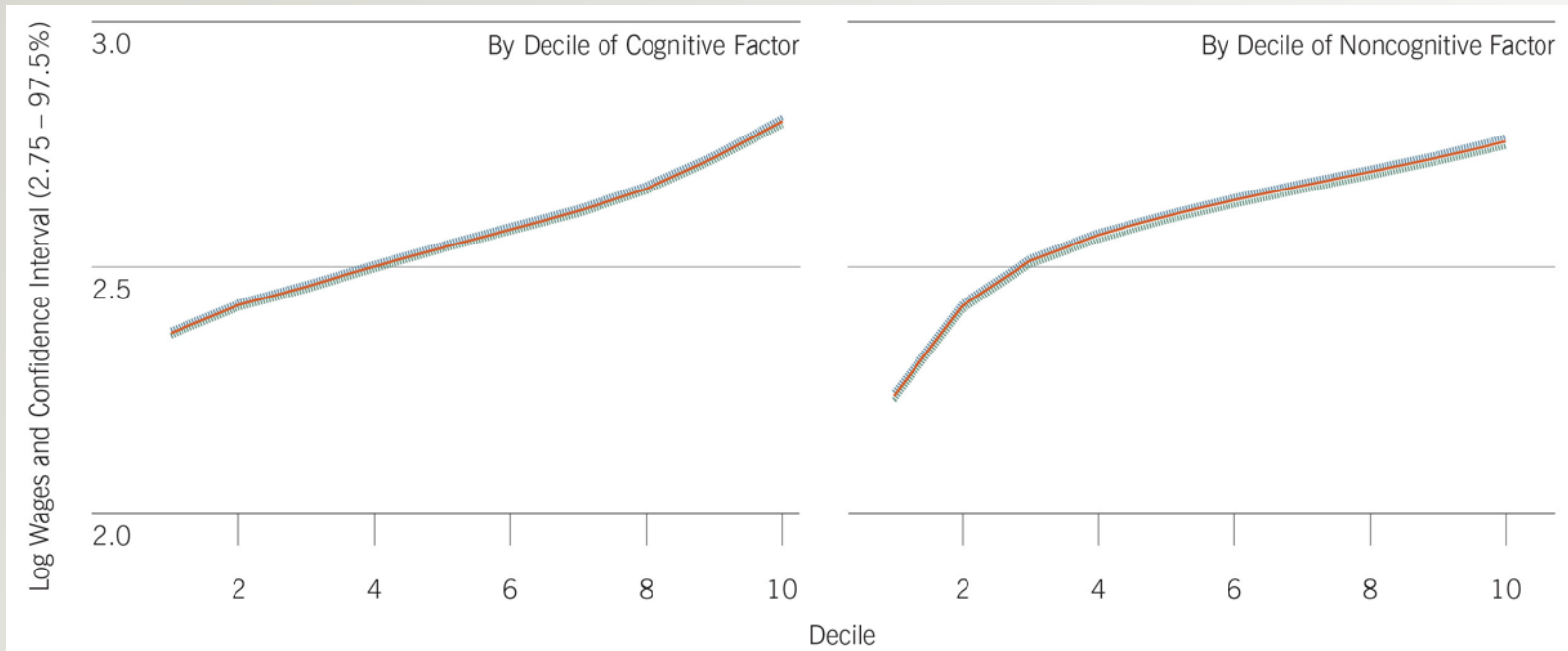
Source: Heckman, Stixrud, and Urzua (2006).

# Probability of being a 4-year college graduate by age 30 (males)



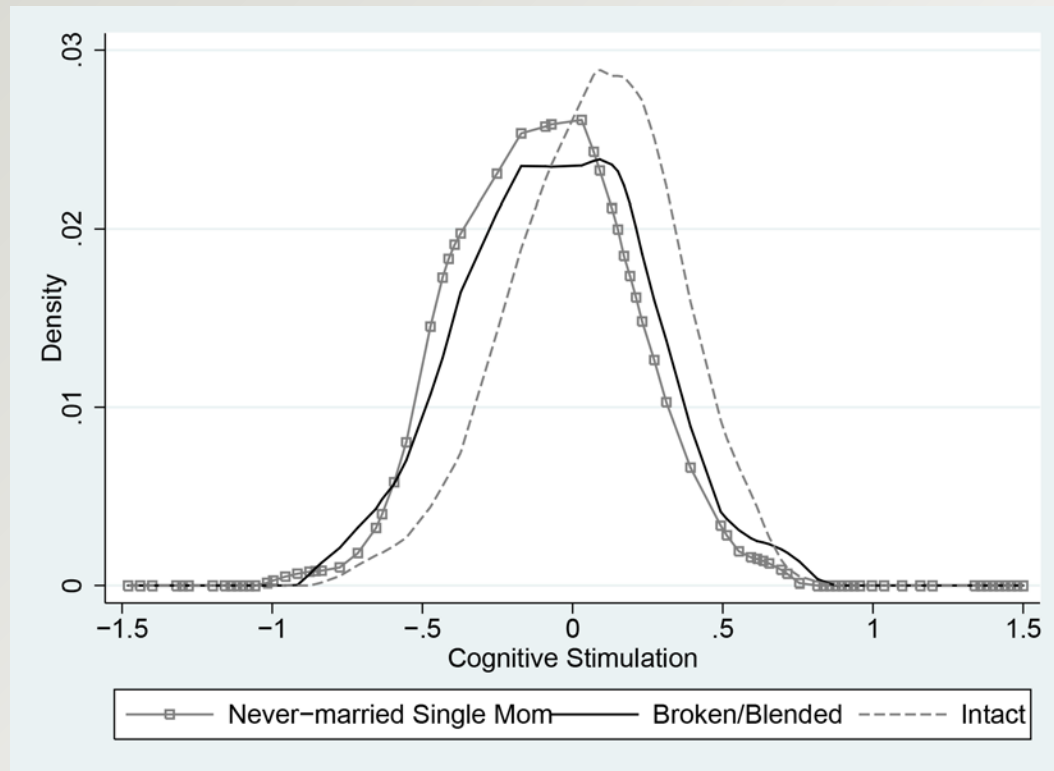


# Mean log wages by age 30 (males)



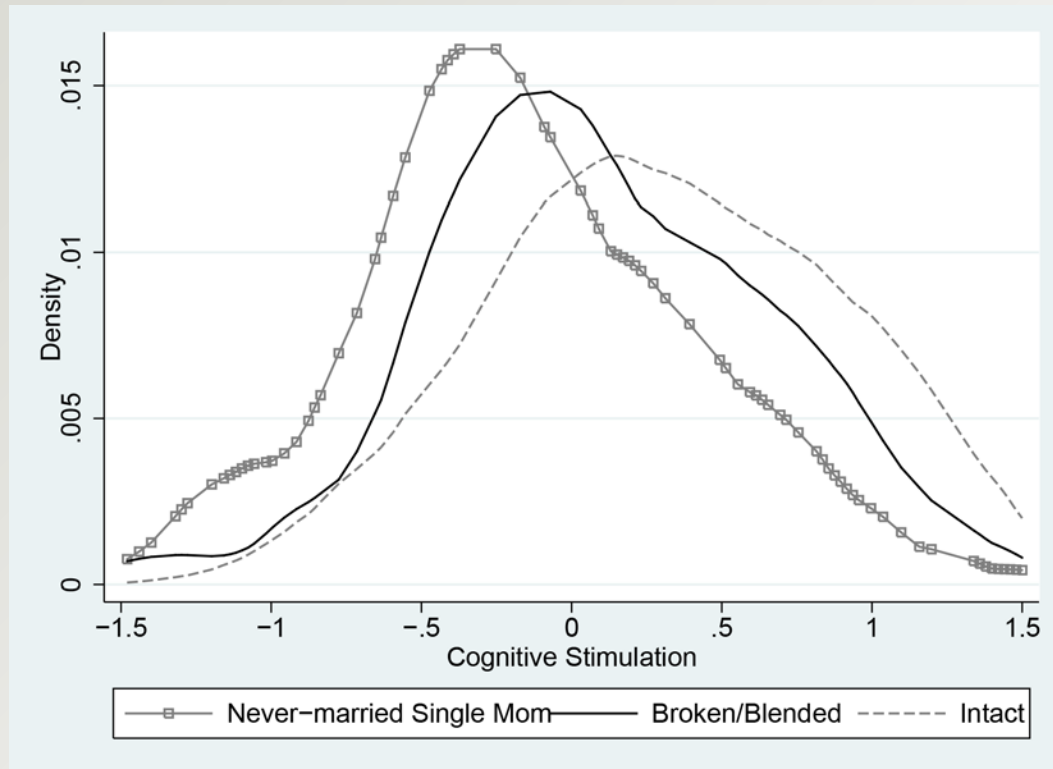
*Notes: The data are simulated from the estimates of the model and our NLSY79 sample. We use the standard convention that higher deciles are associated with higher values of the variable. The confidence intervals are computed using bootstrapping (50 draws).*

# Cognitive Stimulation: Age 0-2, White, By Family Type



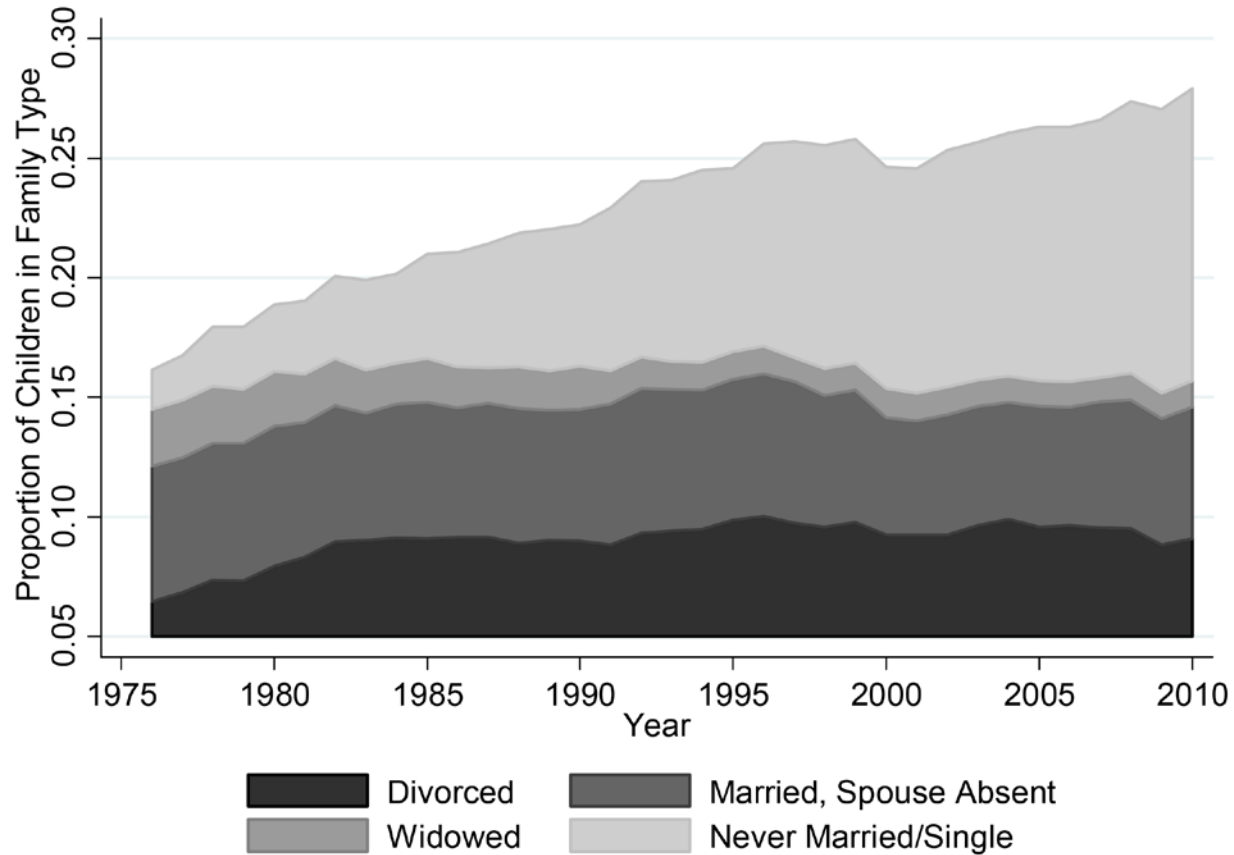
Source: Seong Hyeok Moon (2011) analysis of CNLSY data

# Cognitive Stimulation: Age 10-11, White, By Family Type



Source: Seong Hyeok Moon (2011) analysis of CNLSY data

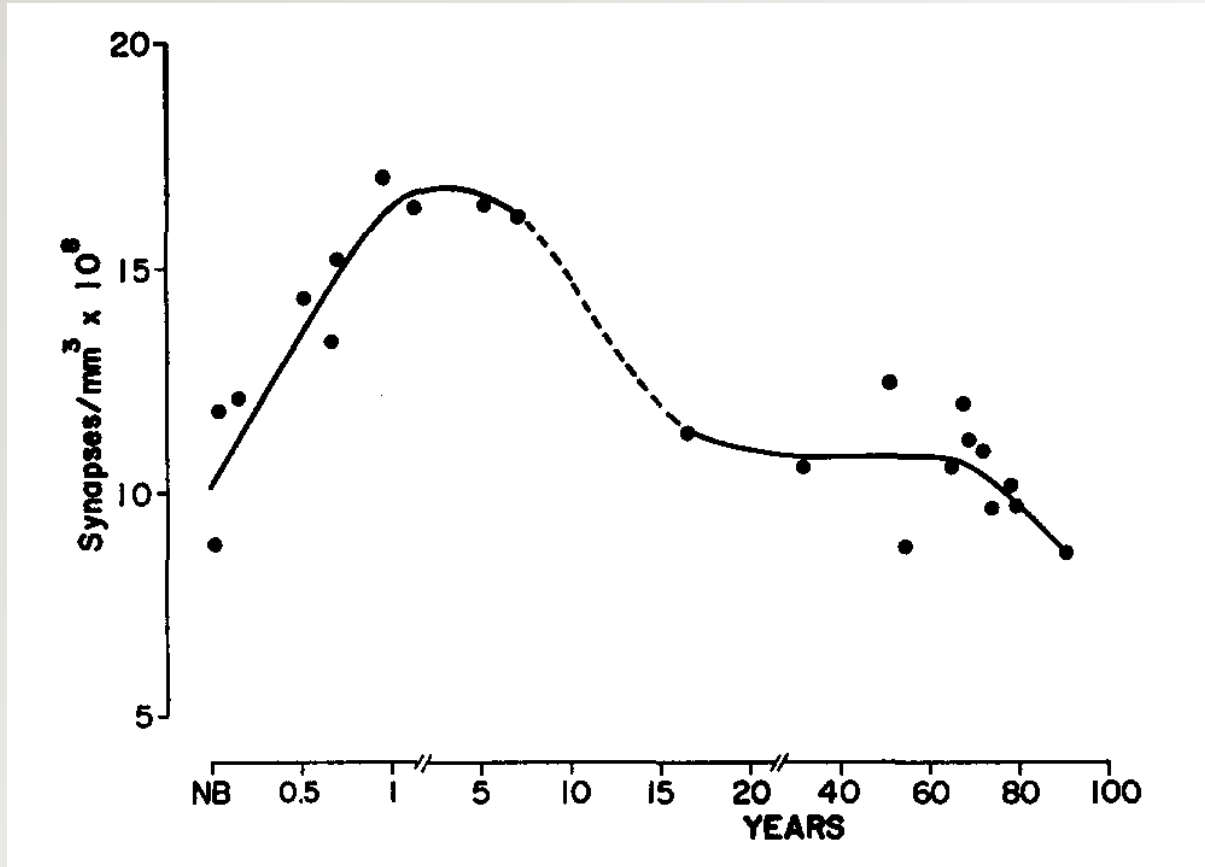
## Children Under 18 Living in Single Parent Households by Marital Status of Parent



Source: March CPS 1976-2010 ; 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.

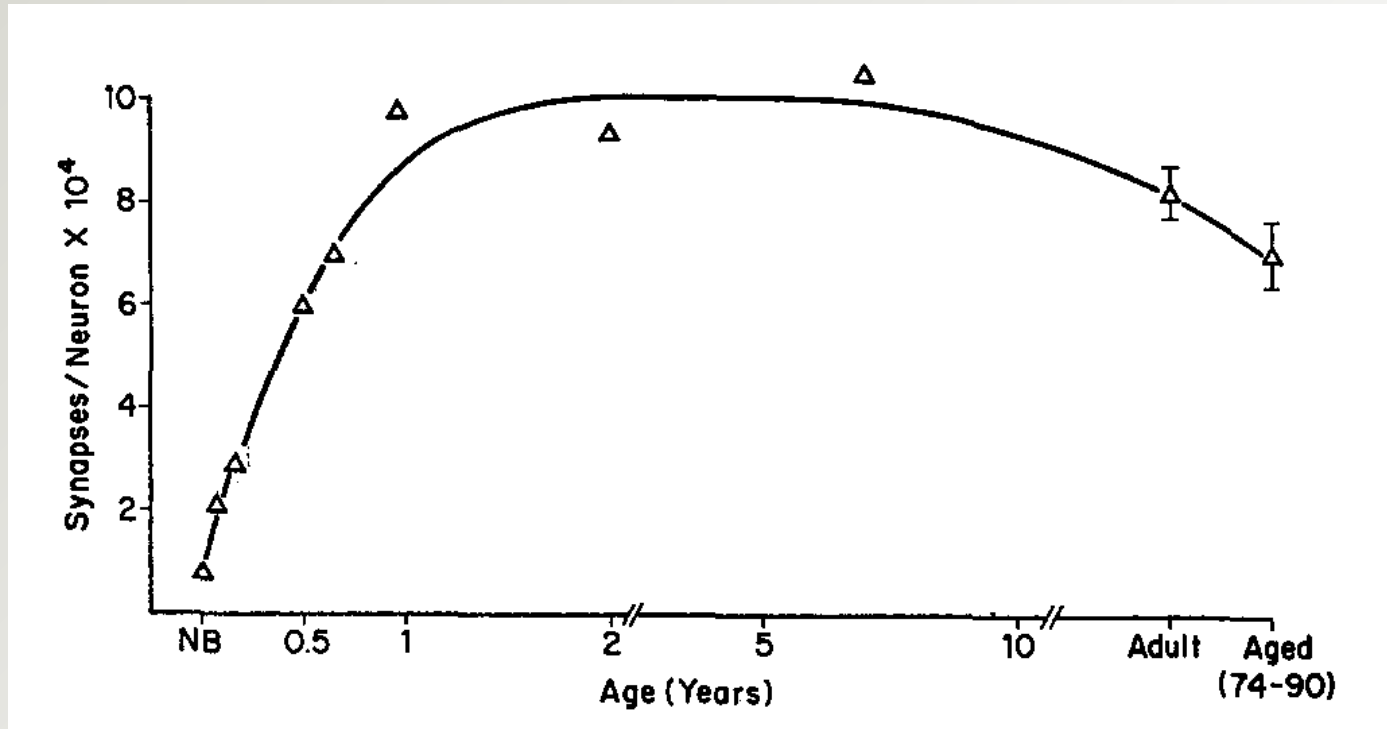
# Human Brain Development

Synapse counts in layer 3 of middle frontal gyrus as a function of age



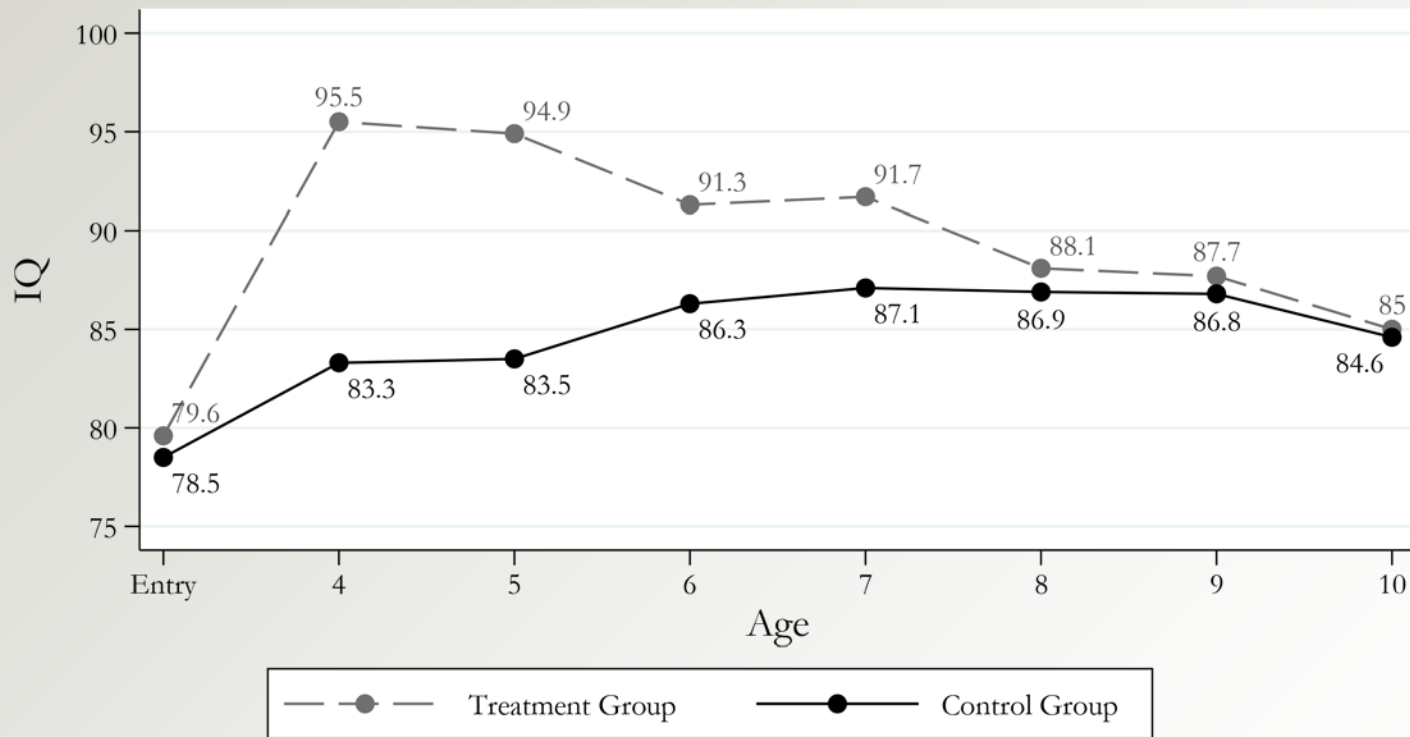
Source: Huttenlocher (1979)

Mean number of synapses per neuron, derived from data of the present study, as a function of age. Confidence limits =  $\pm 1$  S.D.



Source: Huttenlocher (1979)

# Perry preschool program: IQ, by age and treatment group

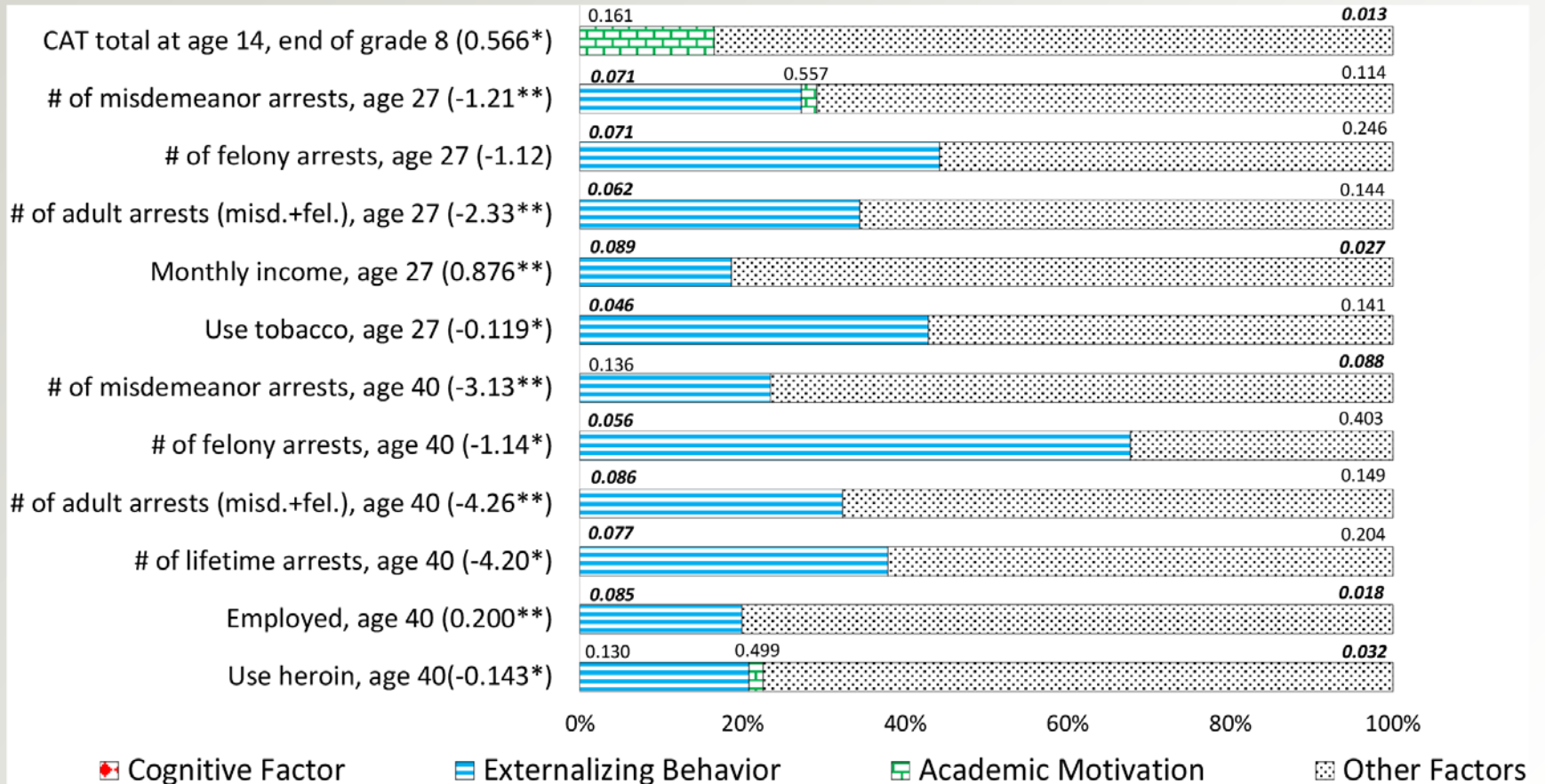


Source: Perry Preschool Program. IQ measured on the Stanford Binet Intelligence Scale (Terman & Merrill, 1960). Test was administered at program entry and each of the ages indicated.

# Decomposing Treatment Effects of the Perry Program



# Decomposition of Treatment Effects, Males



# Decomposition of Treatment Effects, Females

