

# The Power of the Early Years: Policies to Foster Human Development

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## Inequality and Productivity

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- The policies and institutions that countries adopt determine the skills, productivity, and social conditions of their people.

## Fragmented Solutions

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- They focus on one problem at a time with policies that are designed to address that one problem, usually by some remediation strategy.

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

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- It will go a long way toward promoting social mobility and productivity and reducing inequality.

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- What are these policies?

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- Early interventions promote productivity and reduce inequality.



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- Health affects other skills, motivation and education.

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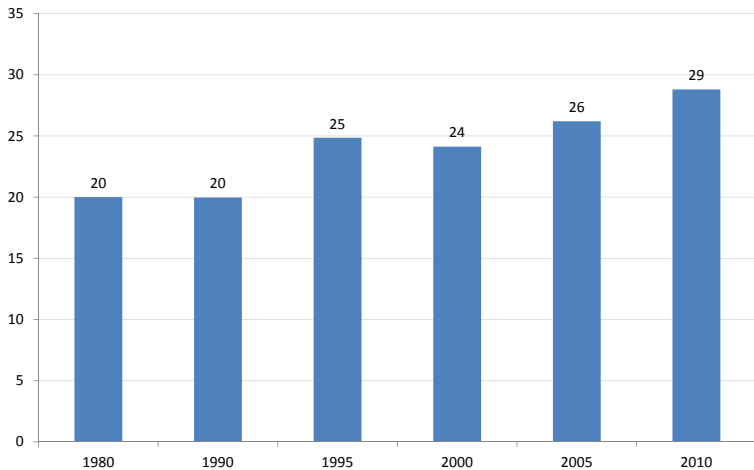
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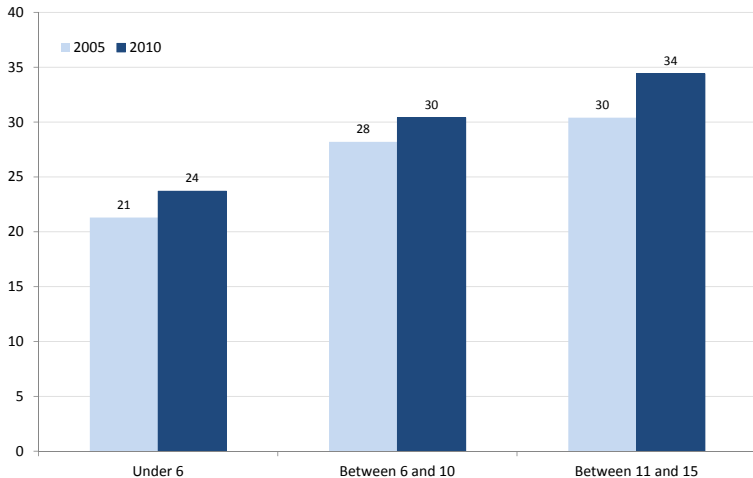
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- Years 0-3 as well as later preschool years 4-5.
- Children raised in disadvantaged environments are much less likely to succeed in schools and in economic and social life and are much less likely to be healthy adults.
- Spain currently has many of its children being raised in disadvantaged environments.

### Percent of Population Under 16 Living in Poverty, Spain



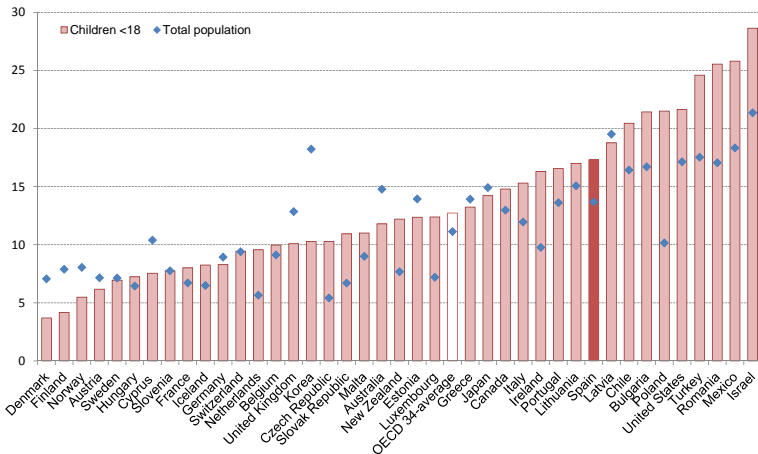
Source: Combined Eurostat and LIS Data

### Percent of Children Living in Poverty by Age Group, Spain



Source: Combined Eurostat and LIS Data

Poverty rates for children and the total population, mid/late-2000s\*



Source: OECD

Note: \* Data refer to 2008 for Germany, Israel, Italy, Korea, Mexico, Netherlands, New Zealand, Norway, Sweden and the United States; 2007 for Canada, Denmark and Hungary; 2006 for Chile, Estonia, Japan and Slovenia; 2005 for France, Ireland, Switzerland and the United Kingdom; 2004 for Australia, Austria, Belgium, Czech Republic, Finland, Greece, Iceland, Luxembourg, Poland, Portugal, the Slovak Republic, Spain and Turkey.

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- This can be done in ways that respect the sanctity of the family and that promote human dignity.



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- 2 Low levels of skill help to explain major social problems (dropping out of school, crime, teenage pregnancy, obesity, and poor health).

- 
- 
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- 4 Current public policy discussions focus on enhancing and rewarding cognitive ability using achievement tests. PISA scores are used to judge the performance of schools and students in those schools.
- 5 However, cognitive skills are only part of what is required for success in life.

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- 7 They contribute to performance in society at large and even help determine scores on the very tests that are used to monitor cognitive achievement.

- 8 Gaps in all types of skills between the advantaged and disadvantaged open up early in the lives of children.



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- 9 Family environments of young children are major predictors of cognitive and socioemotional skills, as well as crime, health and obesity.
- 10 Family influence extends well beyond the transmission of genes.

- 11 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.

- 12 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.

- 13 If society intervenes early enough, it can raise the cognitive, socioemotional abilities and the health of disadvantaged children.

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- 14 Through multiple channels, these effects percolate across the life cycle and across generations.

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- 16 They also foster workforce productivity.
- 17 They promote health and health-improving behaviors.

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

- 19 Early interventions have much higher economic returns than later interventions such as reduced pupil-teacher ratios, public job training, convict rehabilitation programs, adult literacy programs, tuition subsidies or expenditure on police.

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- 20 This greater return arises because of the dynamics of skill formation.

- 21 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.

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- 22 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.

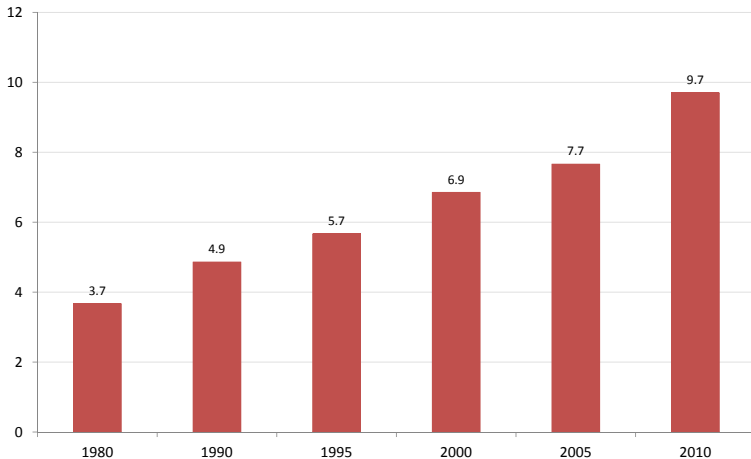
- 23 A major refocus of policy is required to incorporate modern understanding of the life cycle dynamics of skill and health formation and the importance of the early years in creating inequality and opportunity, and in producing skills for the workforce and the larger society.

- 24 Although schools and schooling are important, effective social policy targets and strengthens the family.



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- 25 The family is under challenge in Spain.

### Percent of Children Living in Single Parent Families, Spain



Source: Combined Eurostat and LIS Data

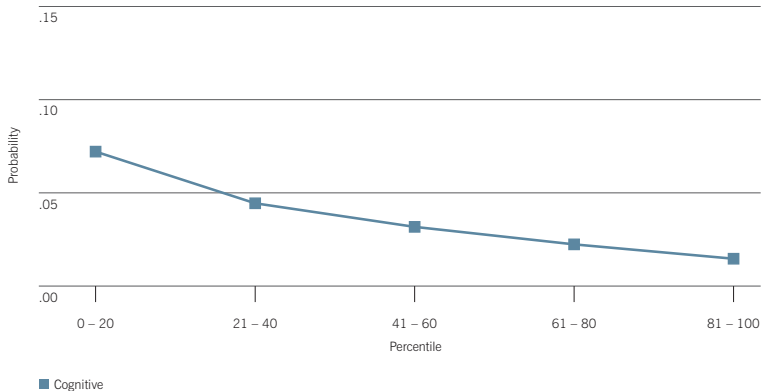
## The Importance of Cognitive and Soft Skills

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- Major advances have occurred in understanding which skills and abilities matter for success in life.
- While cognitive ability is important, so are personality and social skills.

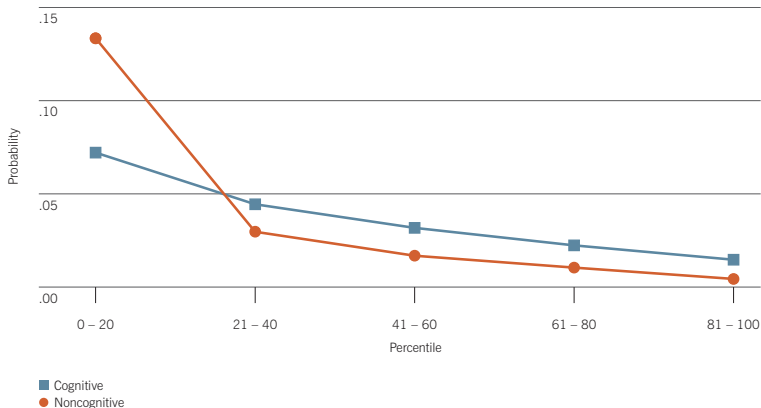
# Ever been in jail by age 30, by ability (males)



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).

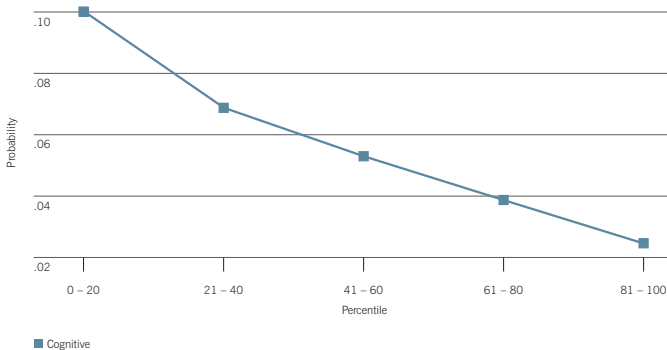
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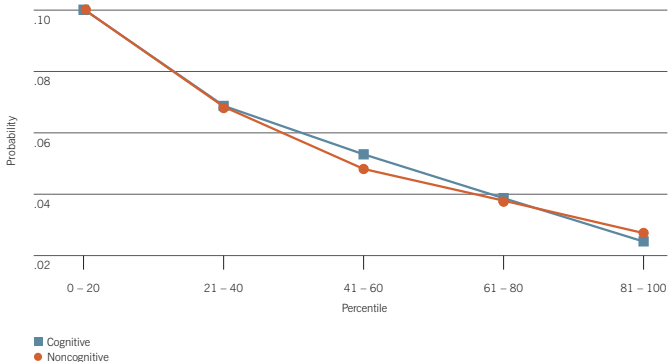
# Probability of being single with children (females)



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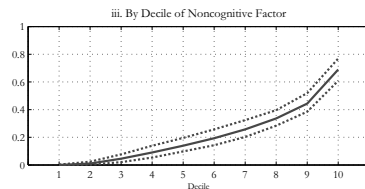
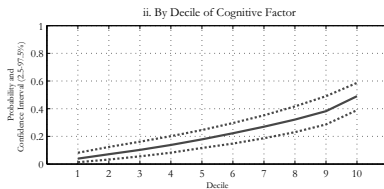


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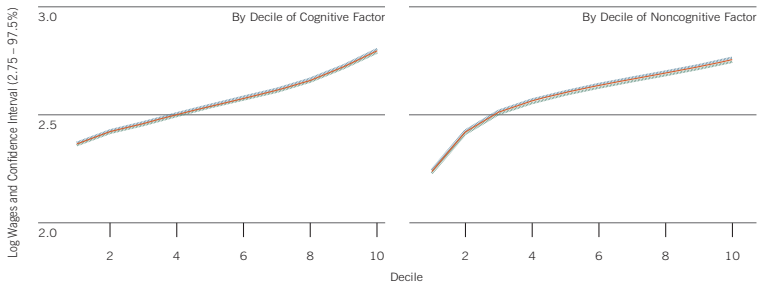


# Probability of being a 4-year college graduate by age 30 (males)



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 (200 draws).

# Mean log wages by age 30 (males)

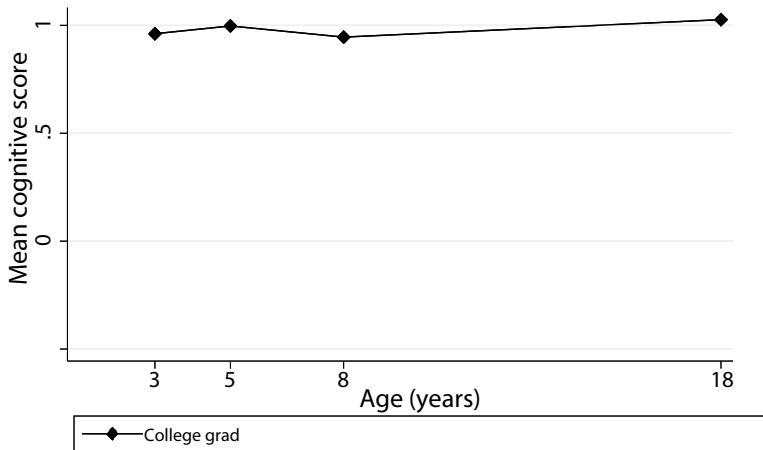


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## Gaps Open Up Early

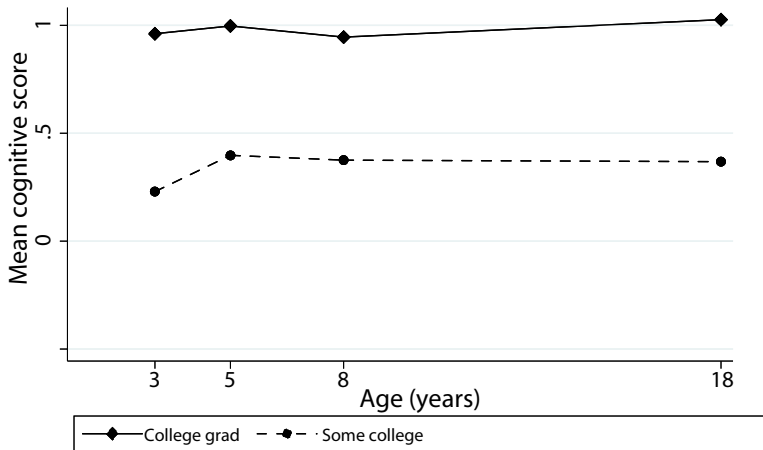
- Gaps in the abilities that play such an important role in determining diverse adult labor market and health outcomes open up early across socioeconomic groups.

# Trend in mean by age for cognitive score by maternal education



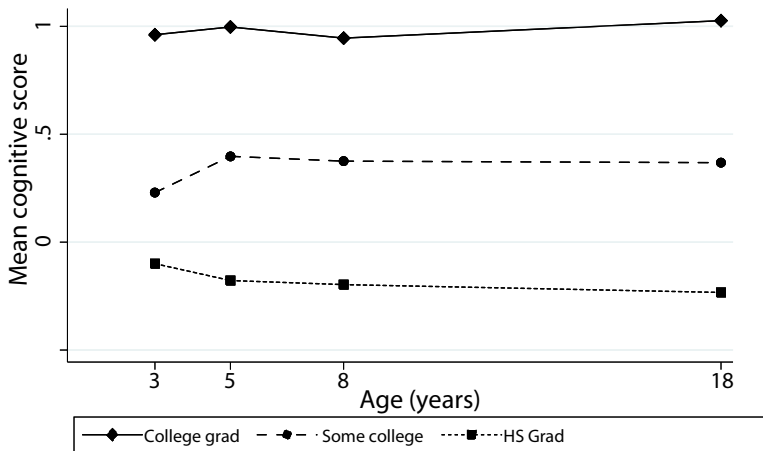
Each score standardized within observed sample. Using all observations and assuming data missing at random. Source: Brooks-Gunn et al. (2006).

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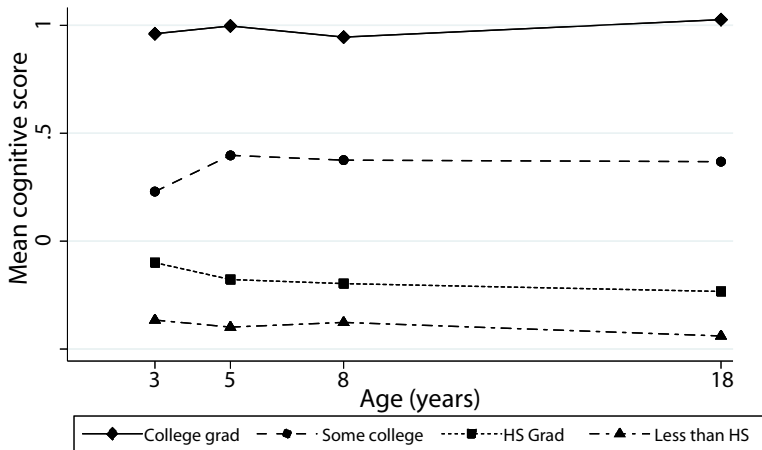
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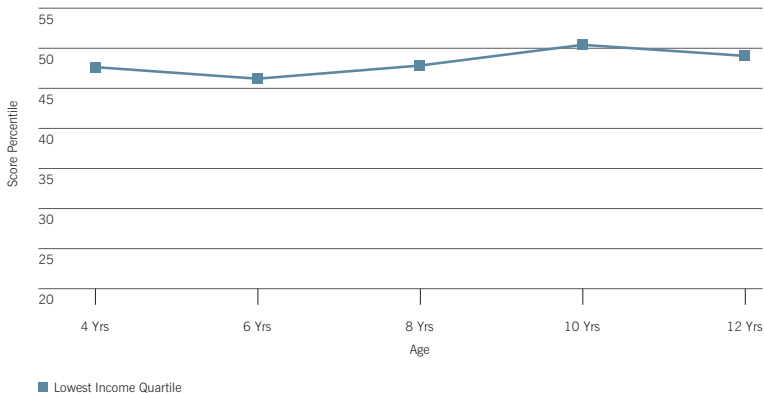
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## Average percentile rank on anti-social behavior score, by income quartile

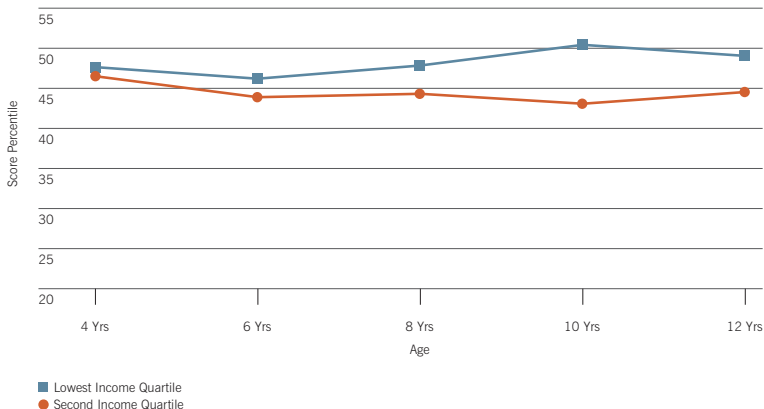
(The higher the score, the worse are behavioral problems)





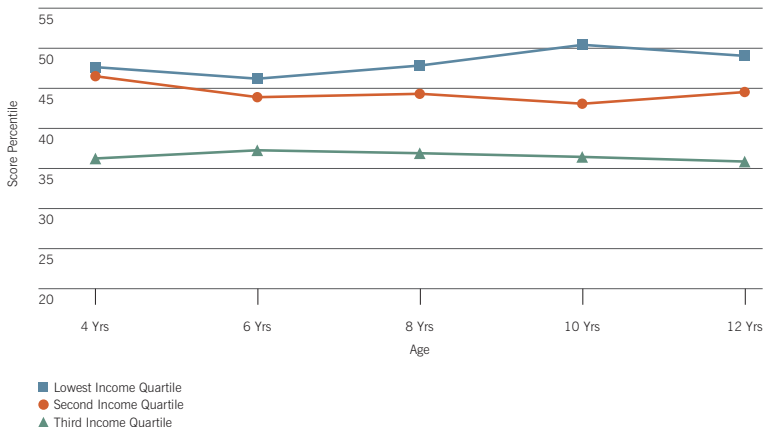
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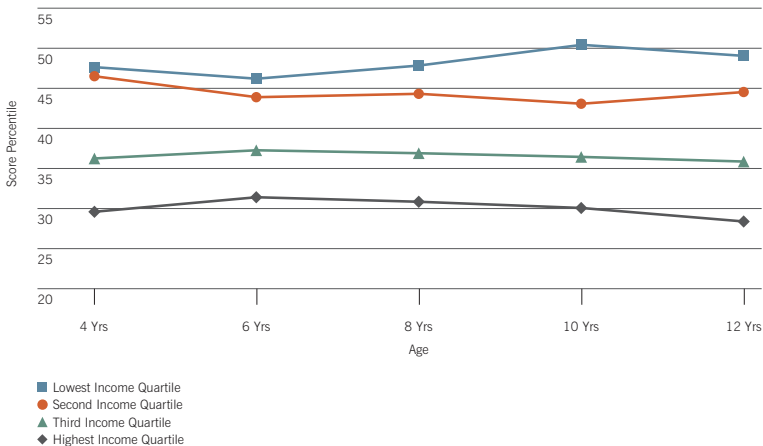
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- Parenting and family investment decisions?



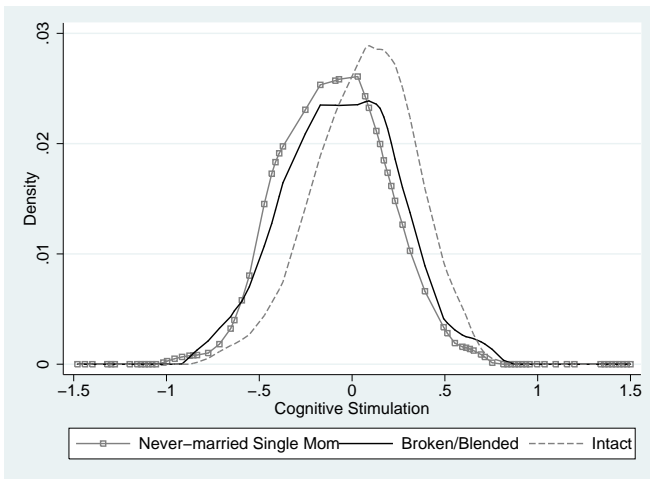
- The evidence from many intervention studies suggests an important role for investments and family environments in determining adult capacities above and beyond the effect of genes, and also in interactions with the genes.

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- Parental attachment is a powerful predictor of adult health.

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- Such environments are highly predictive of child success.

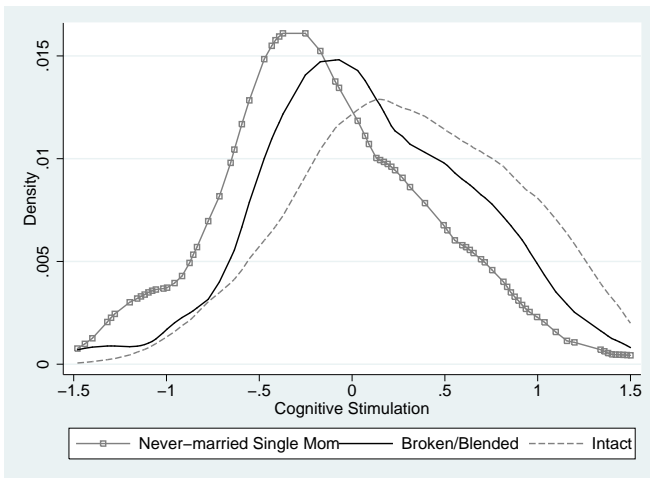
# Cognitive Stimulation: Age 0-2, White, By Family Type



Males

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

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

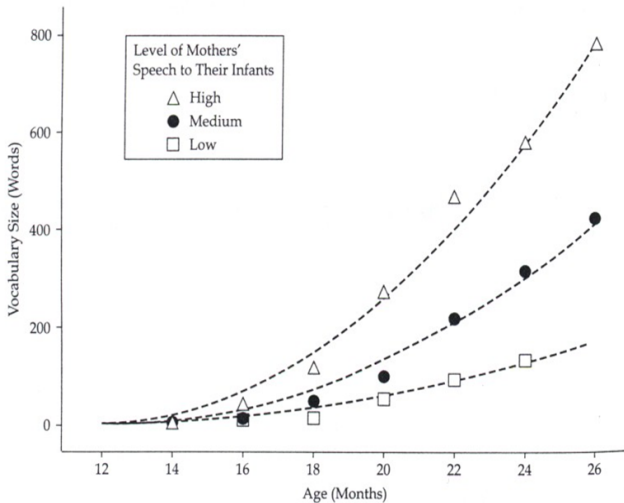


Females

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

- Family environments shape child development.

# Mothers' Speech and Child Vocabulary



Source: Huttenlocher et al. (1991).



# Hart & Risley, 1995

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

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### 2. Cumulative Vocabulary Experiences

Family Status	Words heard per hour	Words heard in a 100-hour week	Words heard in a 5,200 hour year	Word heard in 4 years
Welfare	616	62,000	3 million	13 million
Working Class	1,251	125,000	6 million	26 million
Professional	2,153	215,000	11 million	45 million

## Hart &amp; Risley, 1995

### 3. 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

## Adversity Gets Under the Skin. Evidence on gene-environment interactions

- Adversity in childhood affects child outcomes.

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- Adversity in childhood affects child outcomes.
- Both behavioral and biological evidence.

## The Adverse Childhood Experiences (ACE) Study (Felitti and Anda)

- The largest study of its kind ever done to examine the effects of adverse childhood experiences on health and human development over the lifespan (17,337 participants).

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- A higher ACE score is associated with greater childhood adversity.

## ACEs Increase Likelihood of Heart Disease\*

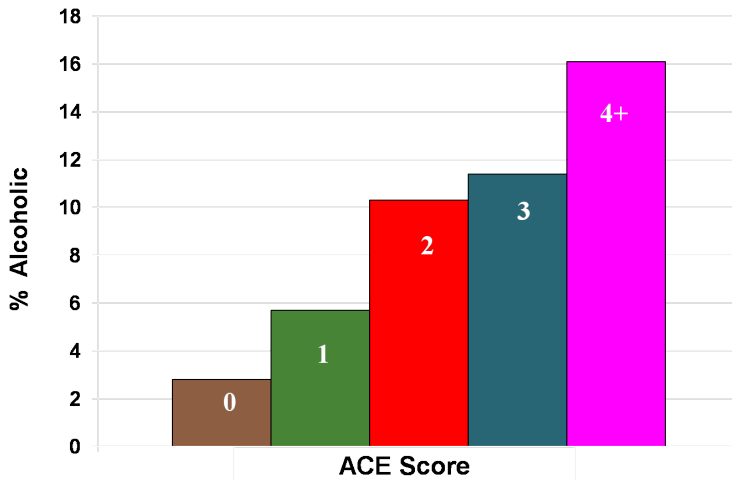
- Emotional abuse 1.7x
- Physical abuse 1.5x
- Sexual abuse 1.4x
- Domestic violence 1.4x
- Mental illness 1.4x
- Substance abuse 1.3x
- Household criminal 1.7x
- Emotional neglect 1.3x
- Physical neglect 1.4x



\**After* correction for age, race, education, and conventional risk factors like smoking and diabetes.  
*Circulation*, Sept 2004.

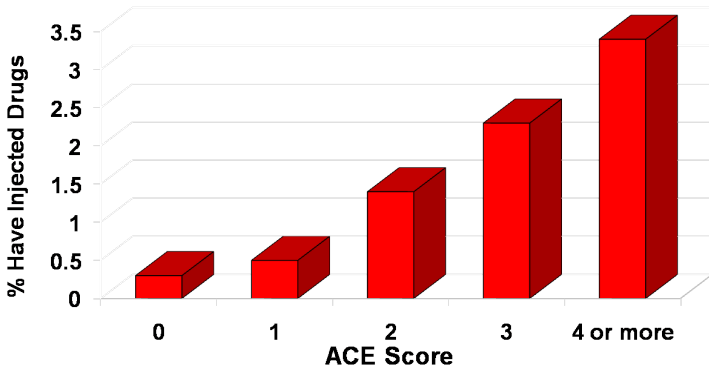
## Health Risk

## Childhood Experiences vs. Adult Alcoholism



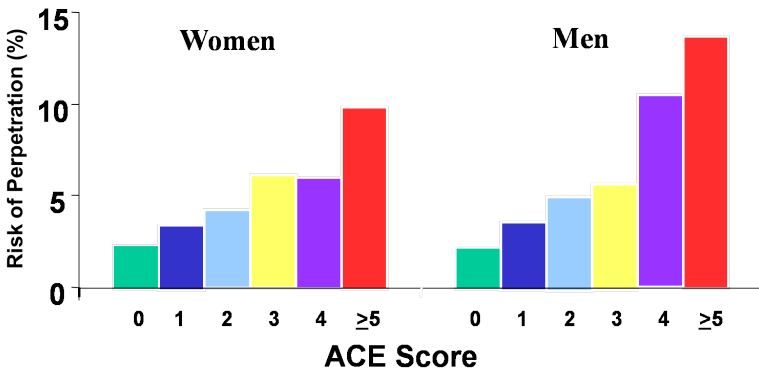
## Health Risk

## ACE Score vs Intravenous Drug Use

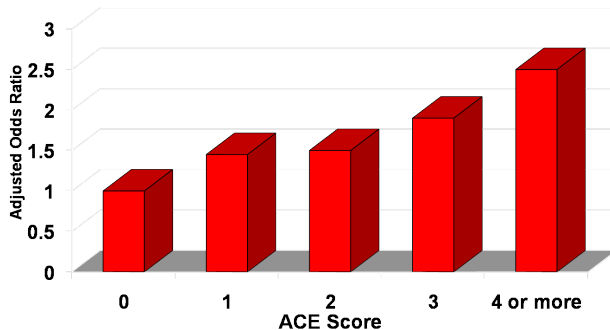


## Well-being

## ACE Score and the Risk of Perpetrating Domestic Violence



## Adverse Childhood Experiences vs. History of STD



## Adversity Affects Brain Development

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- Romanian infant studies support this notion.
- Romanian infants in orphanages received virtually no stimulation (intellectual or otherwise).



## Adversity Affects Brain Development

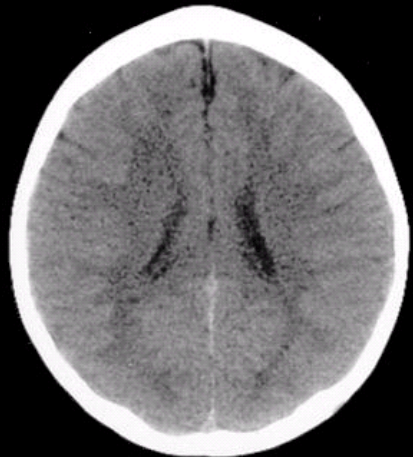
- They were adopted out.

## Adversity Affects Brain Development

- They were adopted out.
- The earlier the remediation and better the adoptive environment, the better the child outcome.

# Abnormal brain development following sensory neglect in early childhood

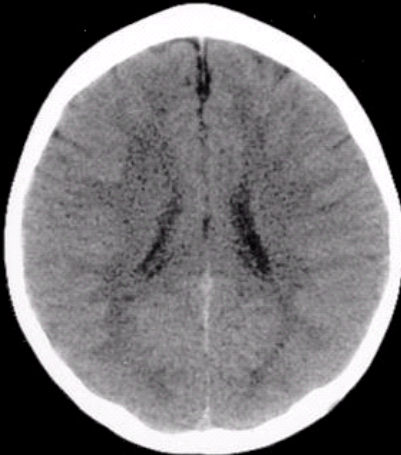
## 3 Year Old Children



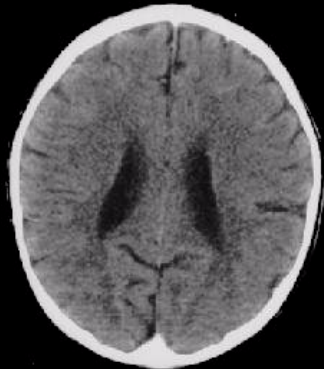
Normal

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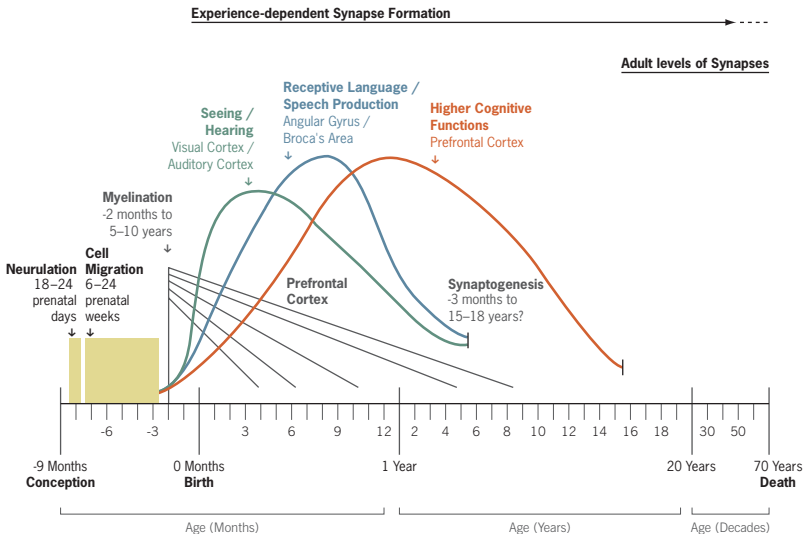
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Extreme Neglect

## Critical and Sensitive Periods

# Human Brain Development



Source: Thompson and Nelson (2001)

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Sensitive and critical periods have been documented extensively for:

- ① binocular vision in the cortex of mammals,
- ② filial imprinting in the forebrain of ducks and chickens,
- ③ language acquisition in humans (Newport, 2002)

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  - E.g., Iron; Vitamin A; Iodine.
  - Blindness, Impaired IQ, etc.
  - Difficult to remediate at later ages.

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- Malnutrition in early childhood has effects on the ability to learn and to concentrate.



## Nutrition: Nutrition as an investment

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- It **indirectly** affects the formation of cognitive skills.
- While the problem of malnutrition is more widespread in developing countries, it is present in developed countries as well.

## Key Policy Issues

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- How costly is delay in addressing early disadvantage? How critical are the early years and for what traits?

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- What is the proper measure of childhood poverty?
- Not income, not parental education per se, but **parenting**.

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



# Early Intervention Programs for Disadvantaged Children

## The Perry Program

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# Early Intervention Programs for Disadvantaged Children

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- The Perry Program is the best studied of all intervention programs.
- The Perry Program was an intensive preschool program that was administered to 58 disadvantaged, black children in Ypsilanti, Michigan between 1962 and 1967.

# Early Intervention Programs for Disadvantaged Children

- The treatment consisted of a daily 2.5 hour classroom session on weekday mornings and a weekly 90 minute home visit by the teacher on weekday afternoons. The length of each preschool year was 30 weeks.

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# Early Intervention Programs for Disadvantaged Children

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

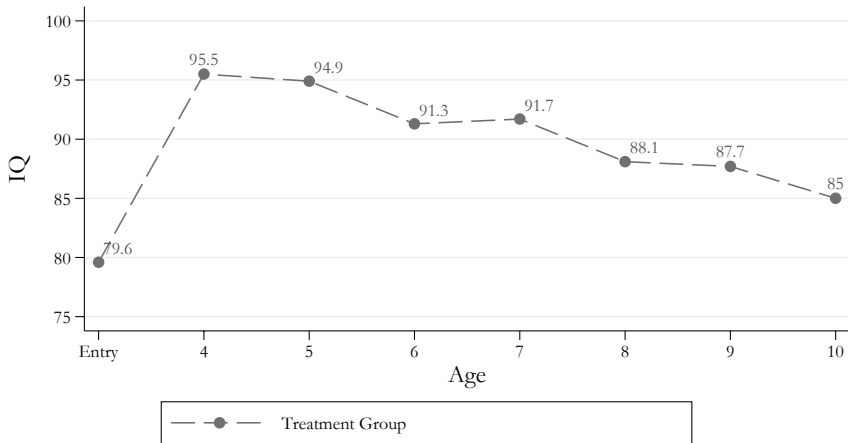
- Perry did not raise IQ.

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- It raised noncognitive-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.

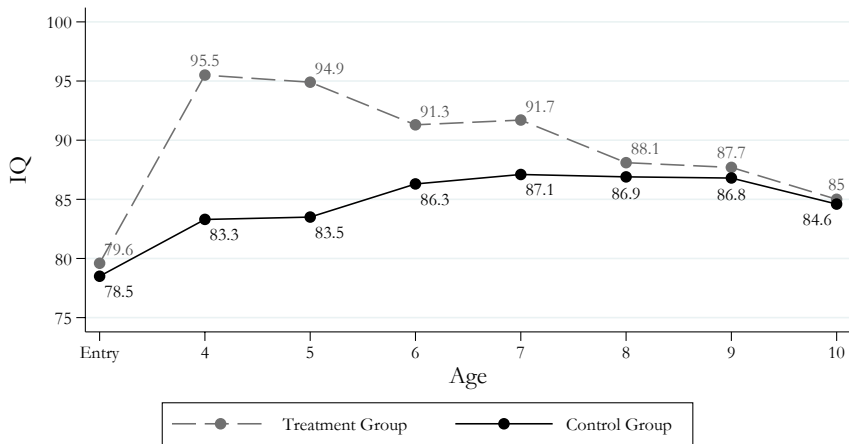


# Perry preschool program: IQ, by age and treatment group



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.

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## Contribution of Program-Induced Increments in Noncognitive Capabilities in Explaining Perry Treatment Effects

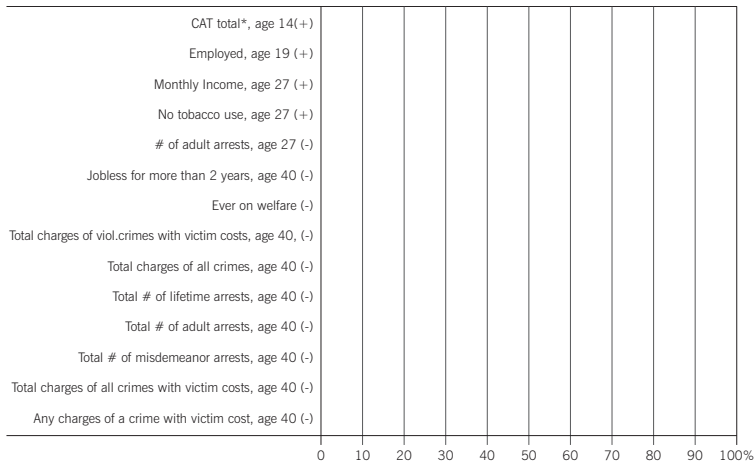
- The Perry Preschool Program worked primarily through improved socioemotional channels.

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- Raises scores on achievement tests but not IQ tests.
- Socioemotional factors and cognitive factors both explain performance on achievement tests (Duckworth, 2006; Borghans et al., 2008; Borghans et al., 2009).

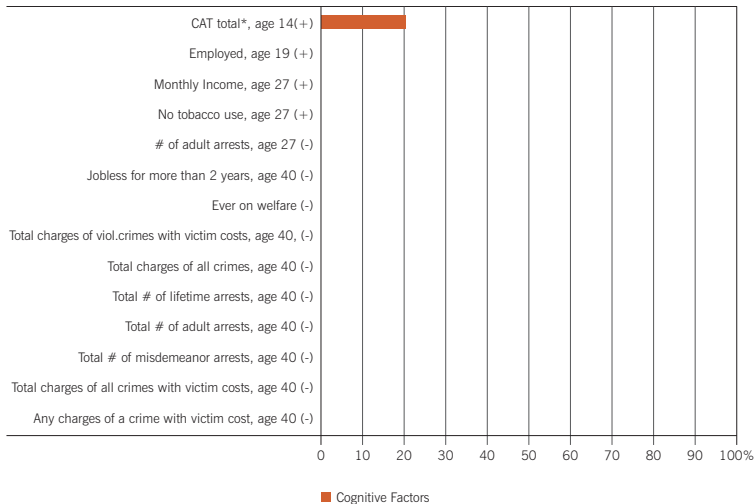
## Decomposing Treatment Effects of the Perry Program

## Decomposition of Treatment Effects, Males

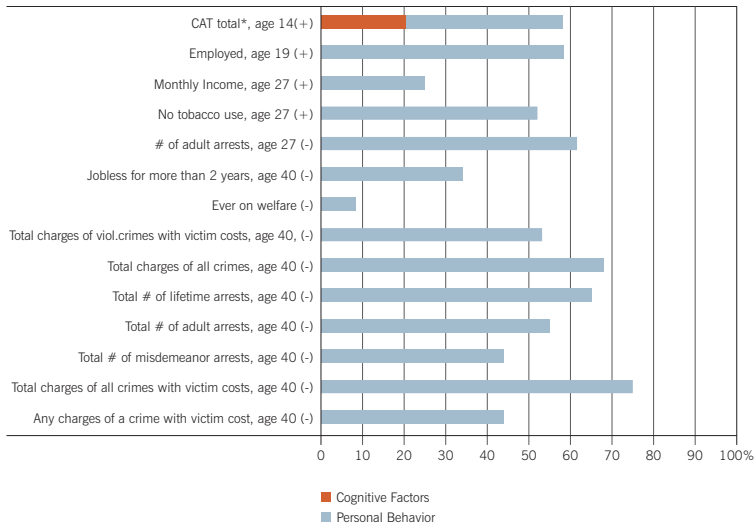




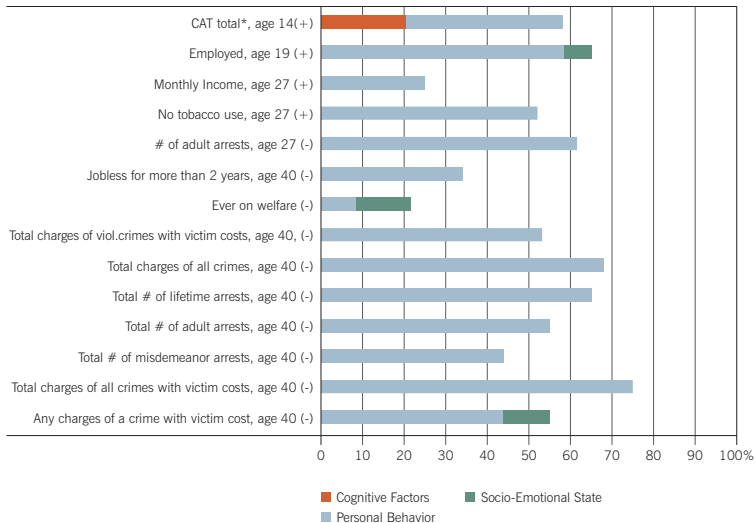
## Decomposition of Treatment Effects, Males



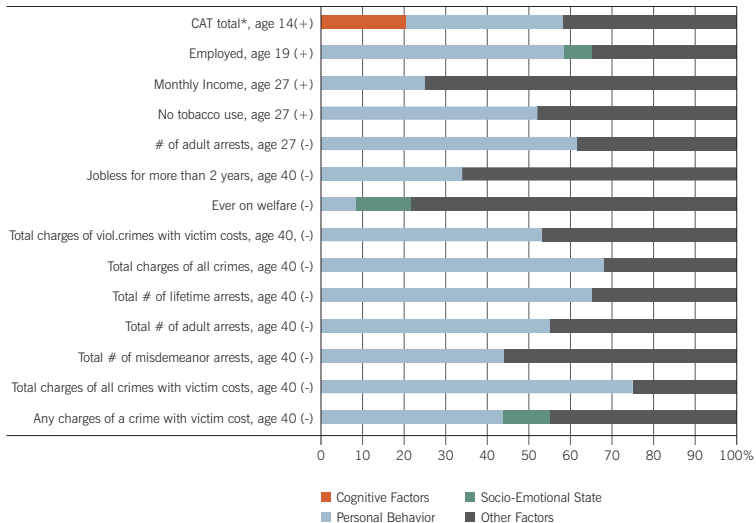
## Decomposition of Treatment Effects, Males



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## Decomposition of Treatment Effects, Males



# Carolina Abecedrian Study : Overview

## ABC Project

- **What:**

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- 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.

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## ABC Project

- **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 Fullday need-based, individualized tutoring + bi-weekly home visits for 3 years at age 6-8.

## Carolina Abecedrian Study : Overview

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- **Who:** Children born to high risk mothers, mostly African-Americans (with some Whites), recruited during pregnancy.

# Carolina Abecedrian Study : Results

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- Better child and adult health



Figure 1: Educational Attainment by Gender and Day-care Treatment

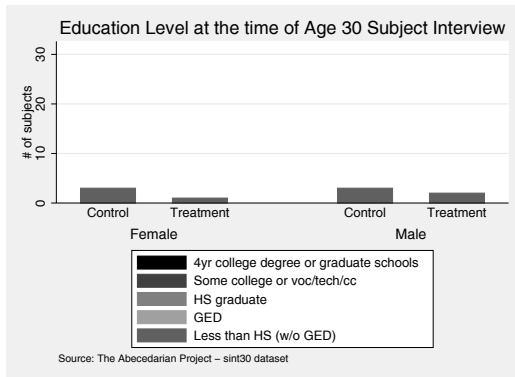


Figure 1: Educational Attainment by Gender and Day-care Treatment

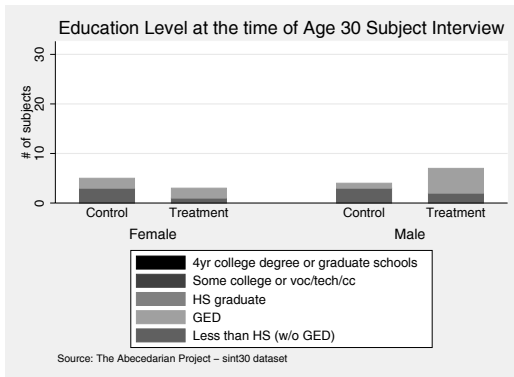


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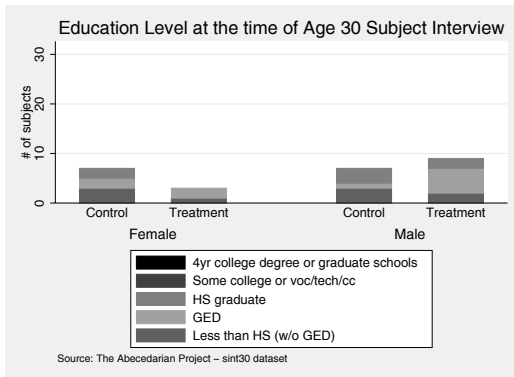


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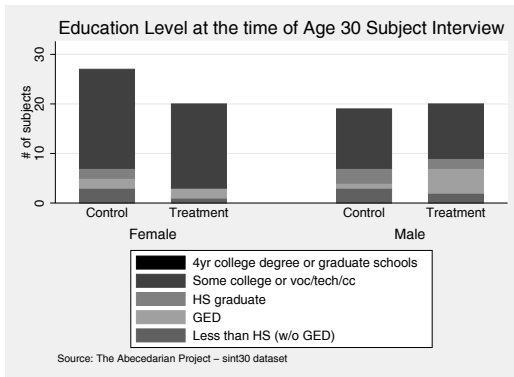
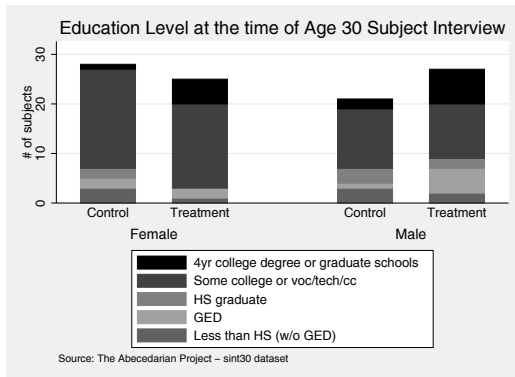


Figure 1: Educational Attainment by Gender and Day-care Treatment



# Early Intervention Programs for Disadvantaged Children

## Nurse Family Partnership : Overview

- NFP is an influential prenatal and early childhood intervention that consists of nurses home visitation and combines prenatal care, parenting education and family planning components.

# Early Intervention Programs for Disadvantaged Children

## Nurse Family Partnership : Overview

- It targets economically disadvantaged families

# Early Intervention Programs for Disadvantaged Children

## Nurse Family Partnership : Overview

- It targets economically disadvantaged families
- The target population consists of first time mothers considered at risk if they are poor, unmarried or young.



## Main results:

- Children born to families that received the nurse visits showed higher intellectual and vocabulary functioning and fewer behavior problems than children in the control group.

## Main results:

- Treated children born to mothers with low psychological resources performed better academically (math and reading) than comparable children in the comparison group.

## Main results:

- Also, the program reduced children's mental health problems and risky behaviors such as smoking, drinking and drug use, crime.

## Main results:

- Also, the program reduced children's mental health problems and risky behaviors such as smoking, drinking and drug use, crime.
- Reduced child abuse.

## Later Remediation is Costly and Often Ineffective

- As **currently implemented**, most adolescent remediation efforts to boost skills, especially those targeted toward raising adolescent cognitive abilities targeted toward the disadvantaged have low returns.

## Later Remediation is Costly and Often Ineffective

For example:

- 1 Active labor market programs

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For example:

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

- General pattern: strong returns on later life programs are higher for the more able.

- General pattern: strong returns on later life programs are higher for the more able.
- Lower returns for the less able adolescents (both cognitive and noncognitive).

- However, motivational programs—programs that build social skills and promote social behavior—are effective in the adolescent years.

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- The pattern arises from the dynamics of skill formation.

**What about promoting education? Should Spain improve the educational attainment of its population?**

- Yes.

## What about promoting education? Should Spain improve the educational attainment of its population?

- Yes.
- But to do so it should boost the skills of young children especially among the disadvantaged (i.e., promote school readiness).



- Lochner and Moretti (2004) establish that education is a better policy than additional police or incarceration for reducing crime.

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- Educational expenditure (to achieve high school graduation status) is four times more effective in reducing crime than expenditure on police officers.

## Education and Health

- Education is also strongly correlated with health.

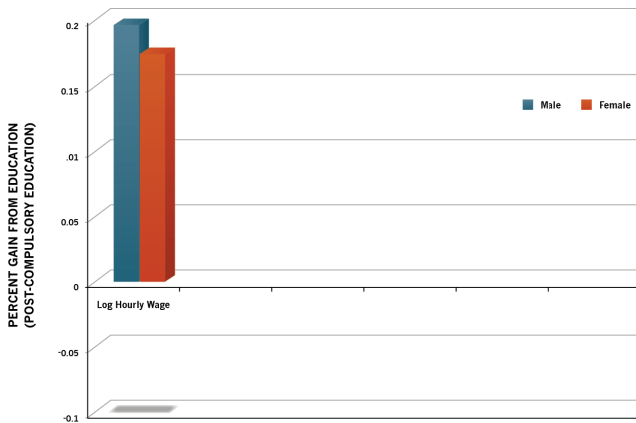
## Education and Health

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## Education and Health

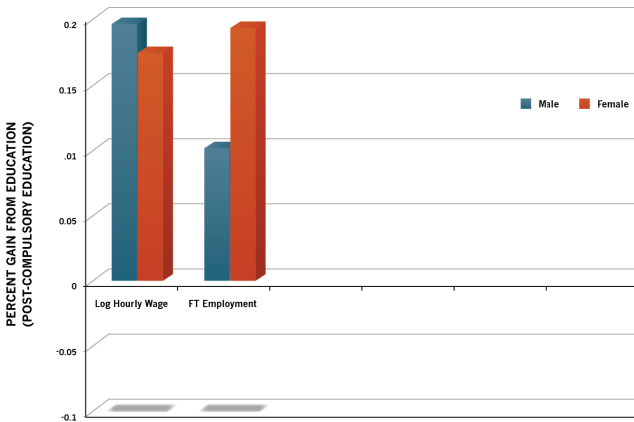
- Education is also strongly correlated with health.
- Should Spain just build more schools? Raise schooling quality?
- Yes, but that is not the whole story or necessarily the most efficient way to reduce crime or to promote health.

# Disparities by Education (Post-compulsory Education)



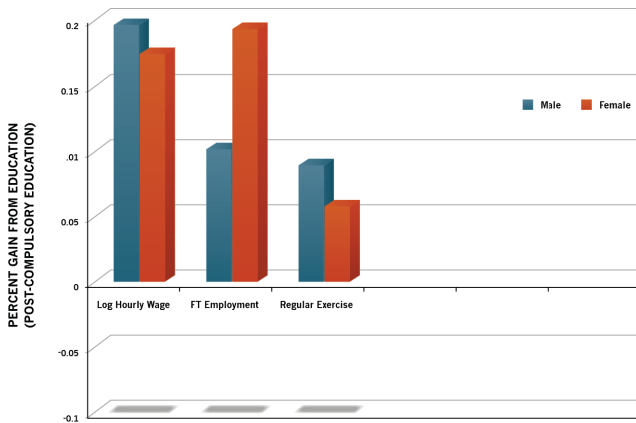
Note: Conti and Heckman (2010). Author's calculations using BCS70.

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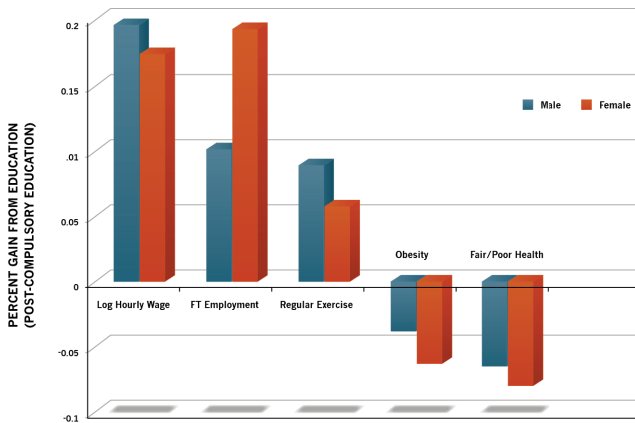
# Disparities by Education (Post-compulsory Education)



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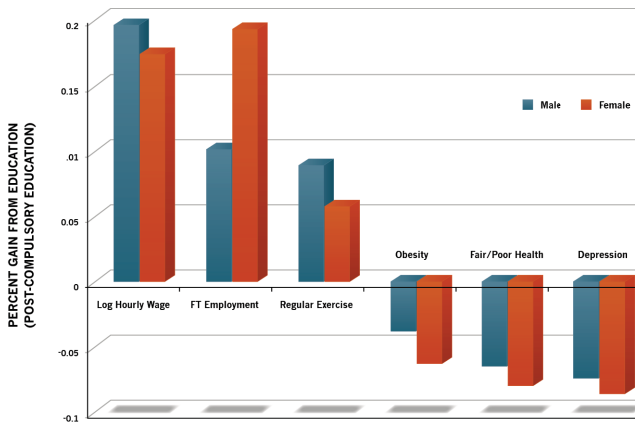


# Disparities by Education (Post-compulsory Education)



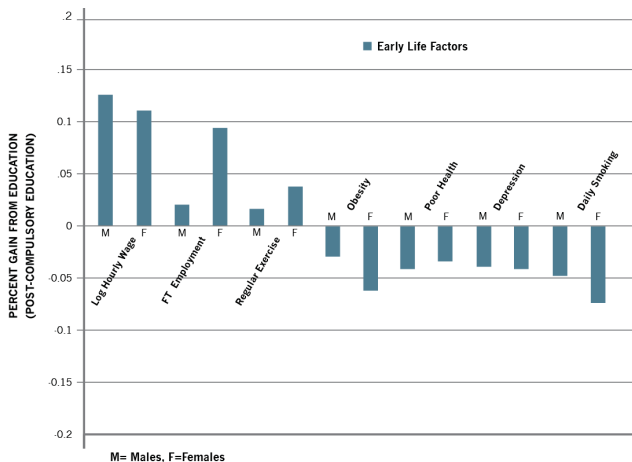
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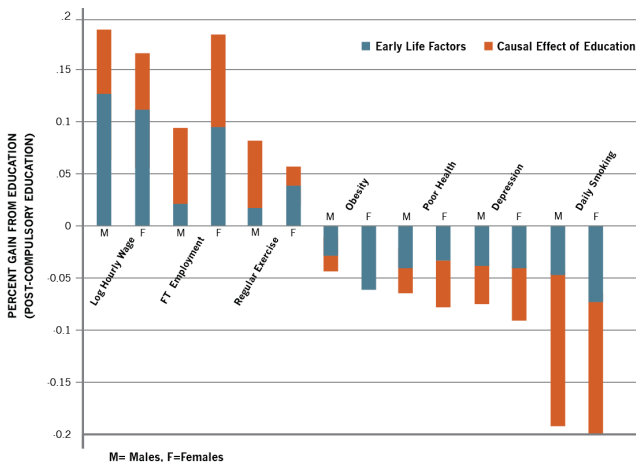
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**Start at the beginning:  
from birth to five.**

# Skills Enhance Each Other: Technology of Skill Formation

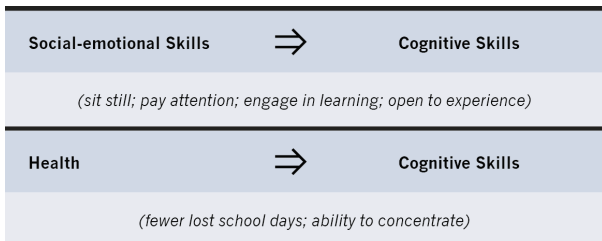
**Social-emotional Skills**



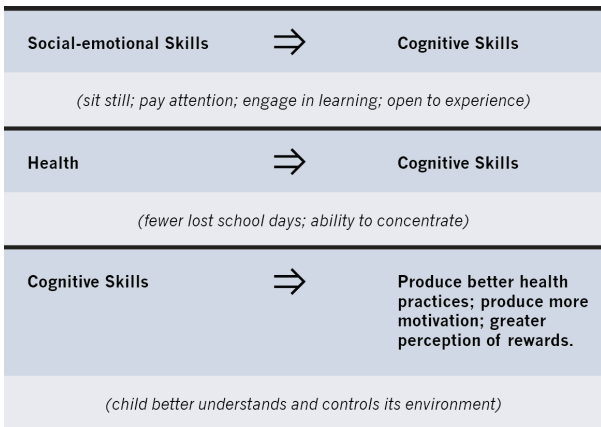
**Cognitive Skills**

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

# Skills Enhance Each Other: Technology of Skill Formation



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Outcomes

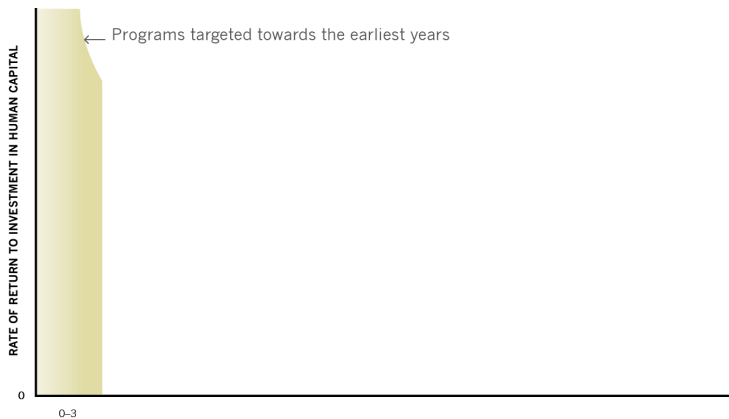
increased productivity, higher income  
better health, more family investment  
upward mobility, reduced social costs



## Prevention, not remediation.

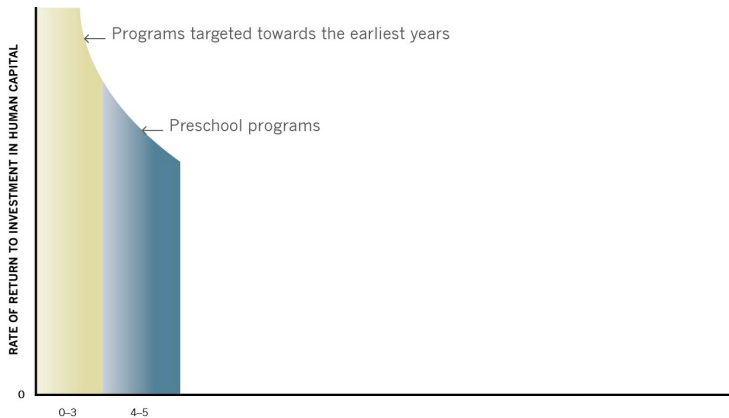
- Early investment produces returns that percolate over the life cycle.

# Returns to a Unit Real Invested



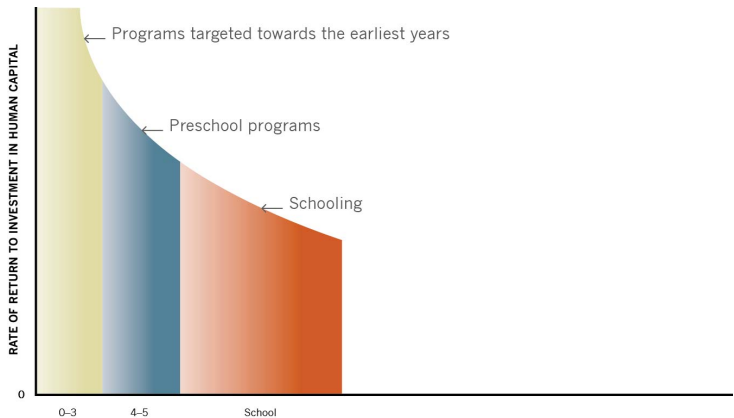
Source: Heckman (2008).

# Returns to a Unit Real Invested



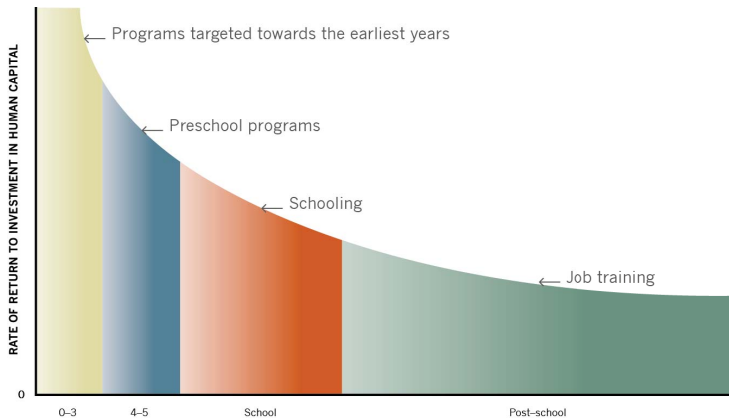
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## Summary and Conclusion

- Many social problems have their roots in deficits in skills.

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- Both cognitive and noncognitive capabilities (including early health) are important in producing a variety of outcomes.

- Skill deficits open up early in life and persist. They produce inequality and reduce productivity.



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- Disadvantage literally gets under the skin and is incorporated in the biology of the person. It can be transmitted across generations.

- Evidence from human and animal studies shows critical and sensitive periods for development.

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- Critical and sensitive periods come earlier for cognitive traits; later for noncognitive traits.

- Recent empirical work on the technology of capability formation provides an operational empirical framework for guiding policy.

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- Capabilities are not fixed at birth or solely genetically determined and are causally affected by parental investment.
- Genes and environments interact to determine outcomes.

- The technology of capability formation rationalizes a large body of evidence in economics, psychology, and neuroscience.

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- Skills are self-productive and cross-productive.



- Dynamic complementarity explains why it is productive to invest in the cognitive skills of disadvantaged young children but why the payoffs are so low for cognitive investments in disadvantaged older children and are even lower for disadvantaged adults.

- Dynamic complementarity explains why it is productive to invest in the cognitive skills of disadvantaged young children but why the payoffs are so low for cognitive investments in disadvantaged older children and are even lower for disadvantaged adults.
- Early investments create a base for enhancing the productivity of later investment.

- There is no equity-efficiency trade-off for investment in the capabilities of young disadvantaged children.

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- There is a substantial equity-efficiency trade-off for investment in the capabilities of older disadvantaged children.

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- There is a substantial equity-efficiency trade-off for investment in the capabilities of older disadvantaged children.
- The tradeoff is much less substantial for investment in noncognitive skills.

- Children from advantaged environments by and large receive substantial early investment.

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- Children from disadvantaged environments typically do not.

- There is a strong case for public support for funding interventions in early childhood for disadvantaged children.



- There is a strong case for public support for funding interventions in early childhood for disadvantaged children.
- The measurement of disadvantage is the **quality of parenting, not income per se.**

- Early childhood programs supplement early family life.

- Early childhood programs supplement early family life.
- They are voluntary and respect the sanctity of family life and the dignity of parents and children.

- 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.