Noncognitive Skills and Socioemotional Learning

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"Character is higher than intellect."
–Ralph Waldo Emerson (1849, reprinted 1979, p. 99)

"We must remember that intelligence is not enough. Intelligence plus character—that is the goal of true education."
–Martin Luther King, Jr

- The importance of character skills is emphasized in the folk wisdom of society. Some examples are

"It doesn't matter if you try and try and try again, and fail. It matters much if you try and fail, and fail to try again."
– Charles Kettering

"Genius is 1% inspiration and 99% perspiration."
–Thomas Edison

"80% of success is showing up."
–Woody Allen

The Big Five

"OCEAN"

- Openness
- Conscientiousness
- Extraversion
- Agreeableness
- Neuroticism

Most Predictive: Conscientiousness

- "Grit"
- Tenacity
- Persistence

Aesop's *Fables* offers numerous examples of the wisdom or lack of wisdom of its subjects where wisdom involves judgment, character and the ability to defer gratification and cooperate with others.

Yet despite the widespread belief of the fundamental importance of these skills in most societies, when countries, schools, or foundations measure the output of schools or educational interventions or the quality of the societies, they invariably neglect character skills and measure success by achievement tests.

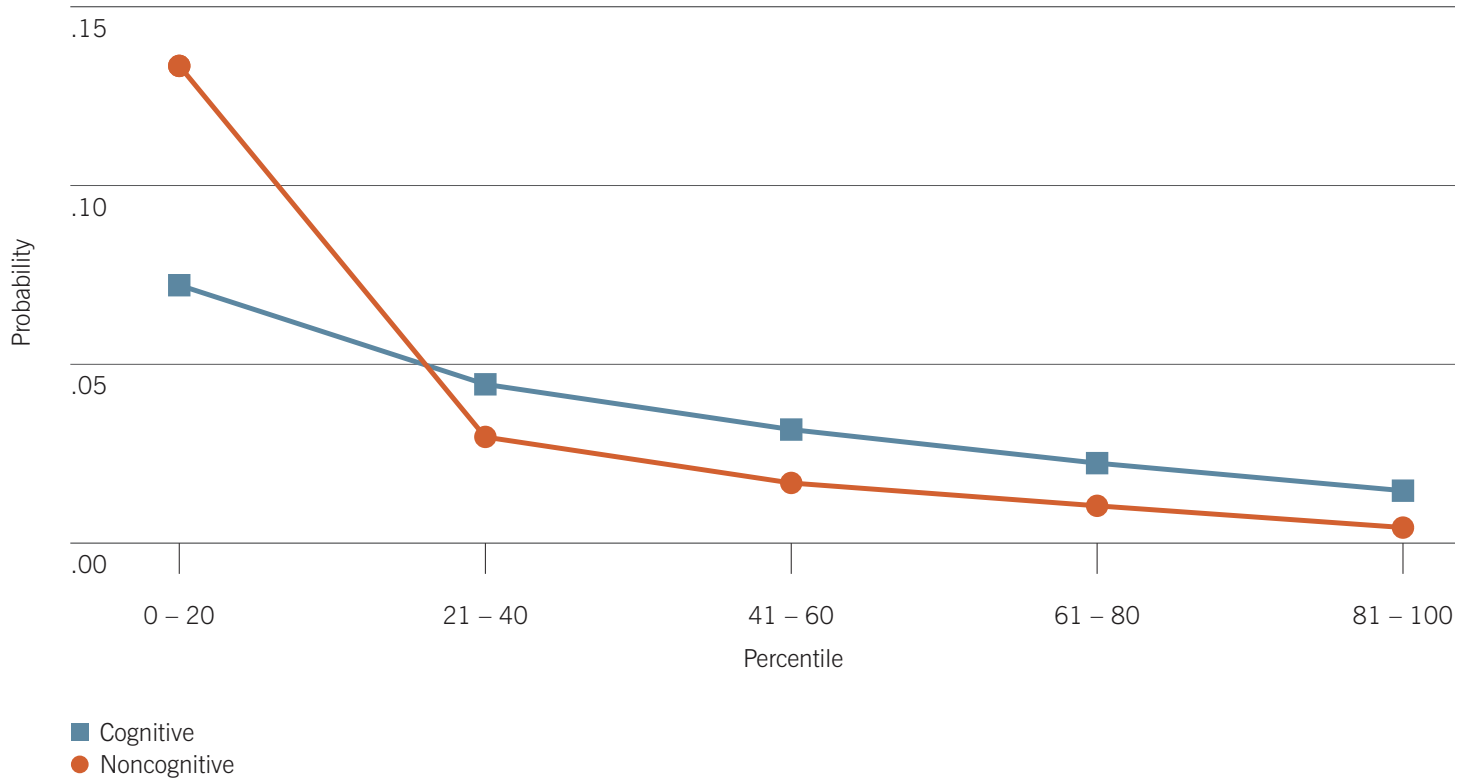
- PISA
- NCLB
- AFQT

- Recent evidence shows that:
  1. There are stable personality skills.
  2. There are accurate ways to measure these skills.
  3. These skills are not "set in stone" at birth.
  4. Skills evolve over the life cycle.
  5. While there is a powerful genetic component, genetics is far from being the whole story.
  6. Personality skills can be shaped by families and environments.

- Recent research also distinguishes aspects of cognition.
  1. IQ is a measure of raw problem solving ability.
  2. Achievement tests capture acquired knowledge which depends on IQ and motivation to learn.
  3. In a crude way, achievement tests capture some noncognitive skills but bundle with cognitive skills.

A core set of cognitive and noncognitive skills predict a wide variety of behaviors.

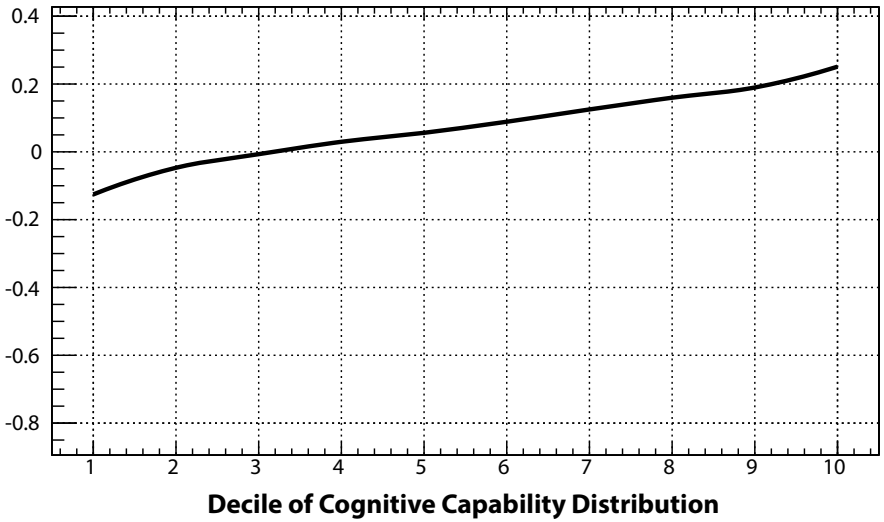
Ever been in jail by age 30, by ability (males)

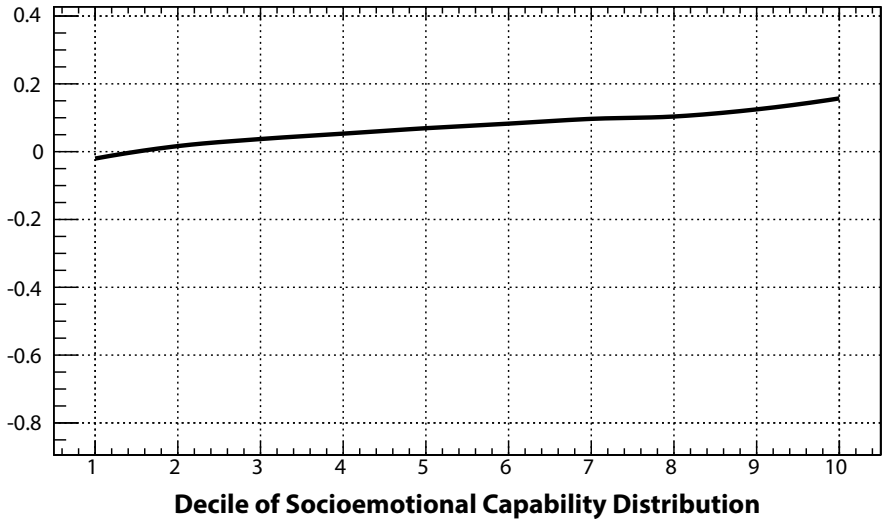


Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating the cognitive ability.

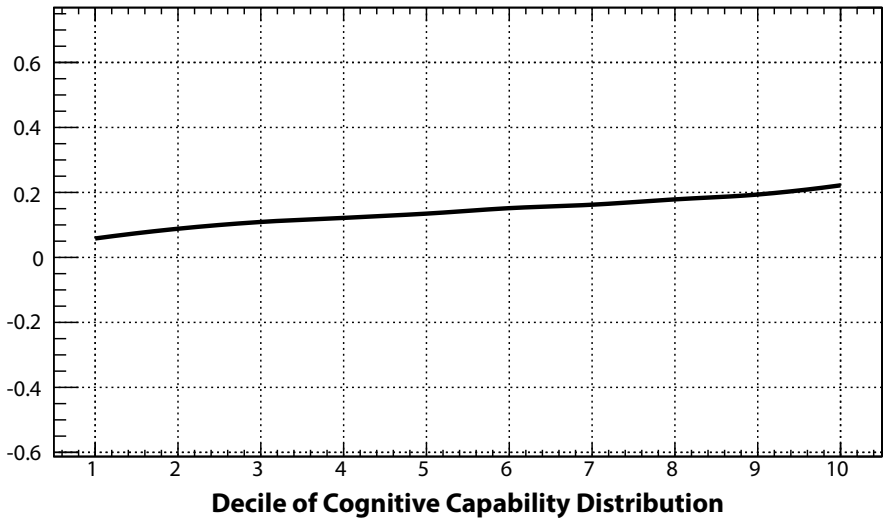
Source: Heckman, Stixrud, and Urzua (2006).

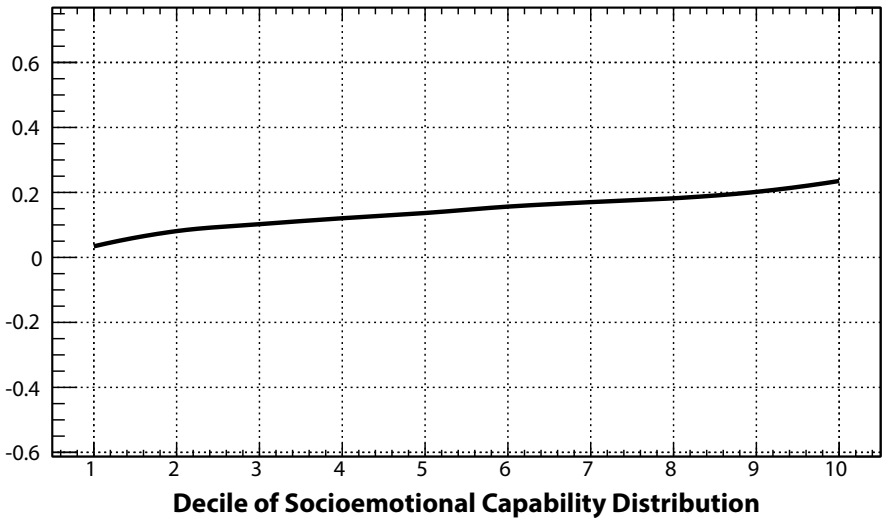
Cognitive and Socioemotional Factors: Physical Health, Males



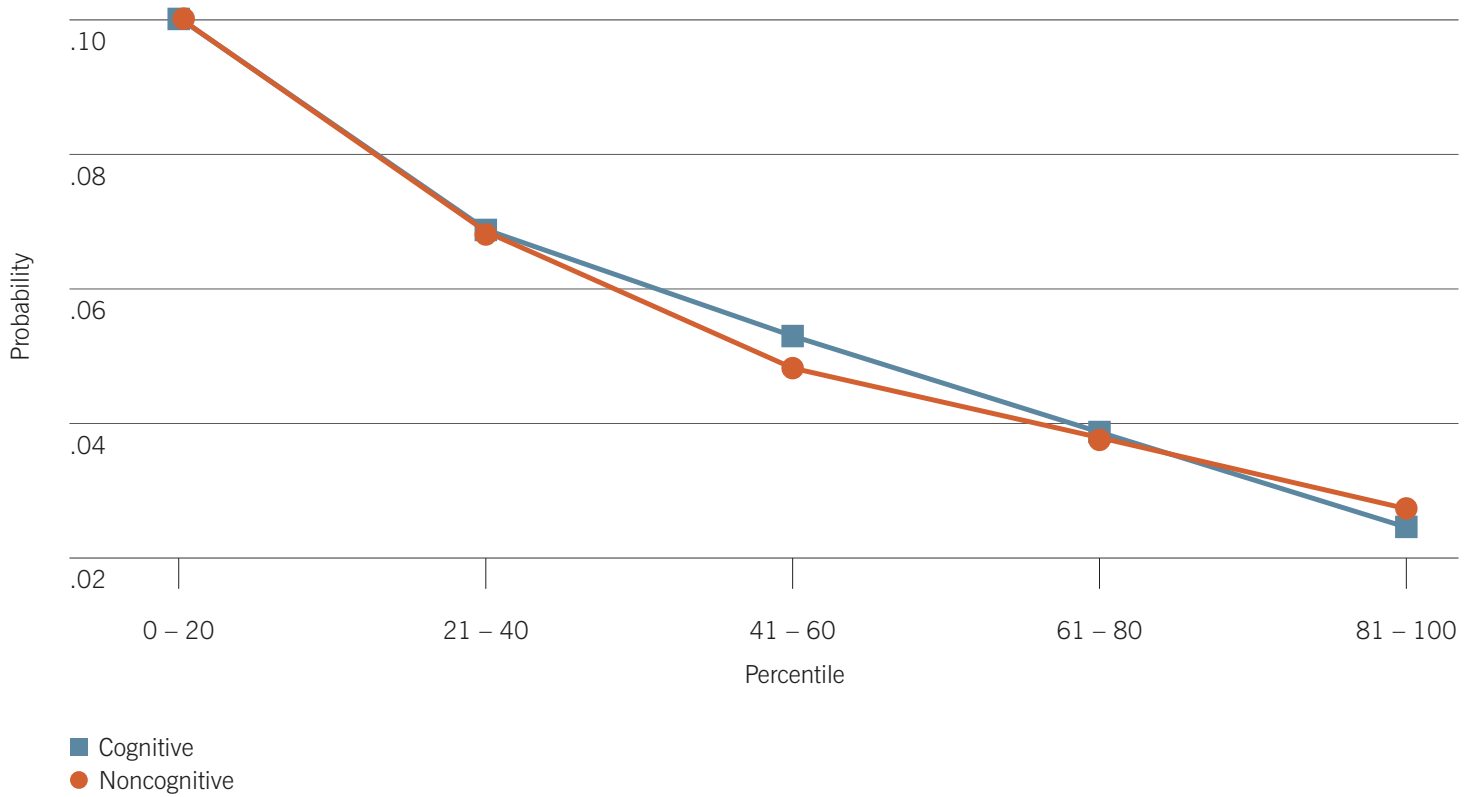


The Effect of Cognitive and Socioemotional Endowments on Mental Health at Age 40





Probability of being single with children (females)



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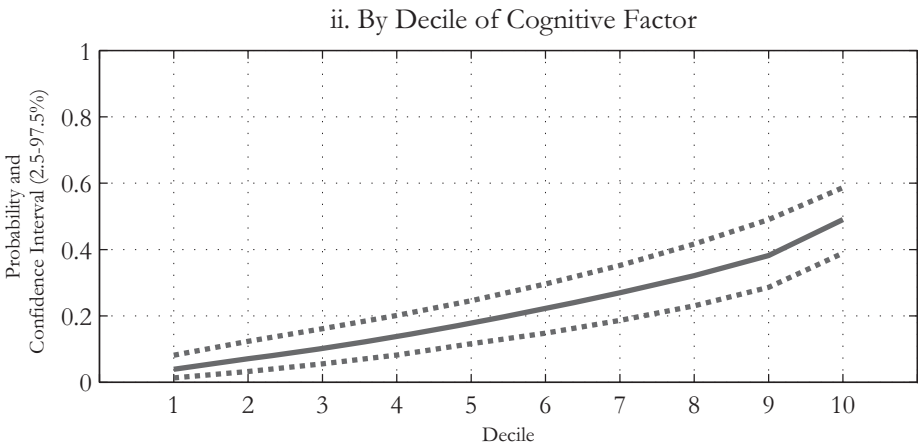
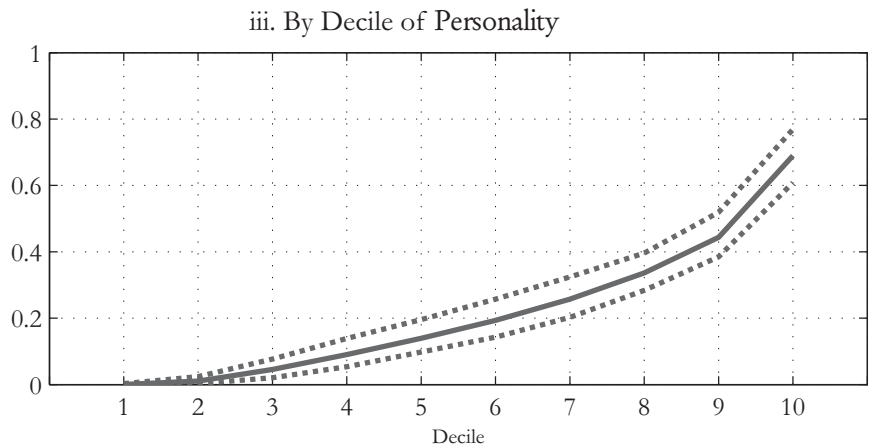
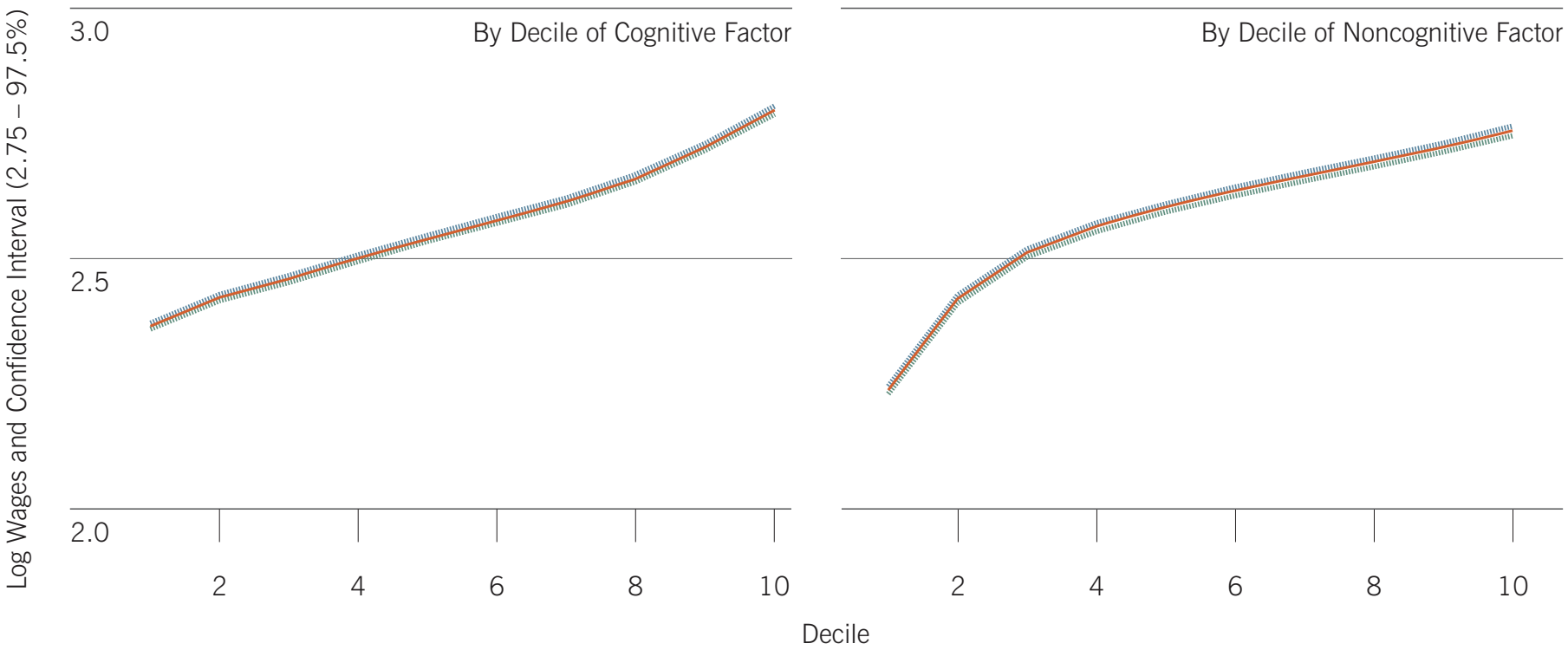
Source: Heckman, Stixrud, and Urzua (2006).

Probability of being a 4-year college graduate by age 30



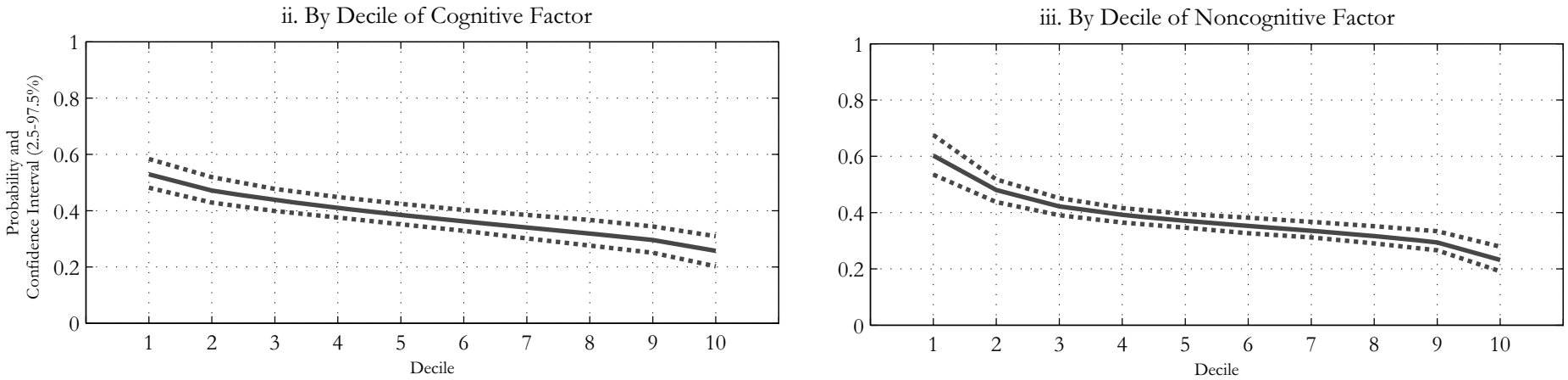


Mean log wages by age 30 (males)



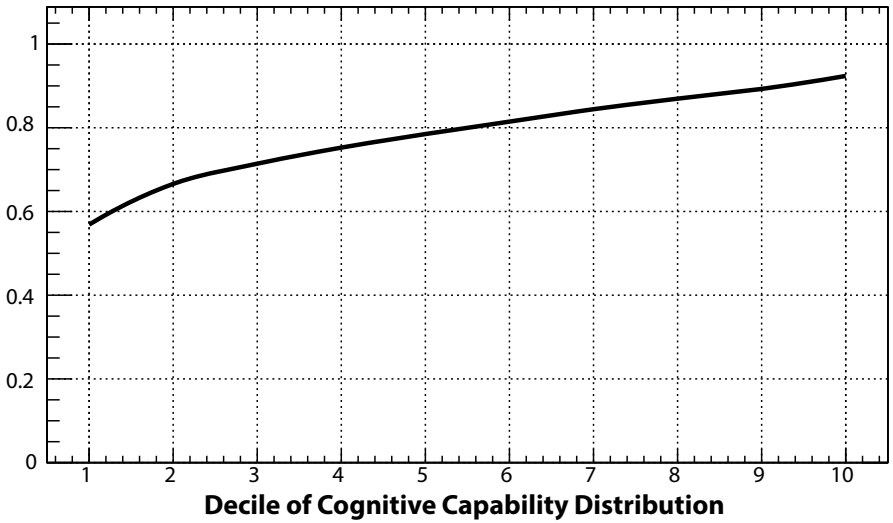
Notes: The data are simulated from the estimates of the model and our NLSY79 sample. We use the standard convention that higher deciles are associated with higher values of the variable. The confidence intervals are computed using bootstrapping (50 draws).

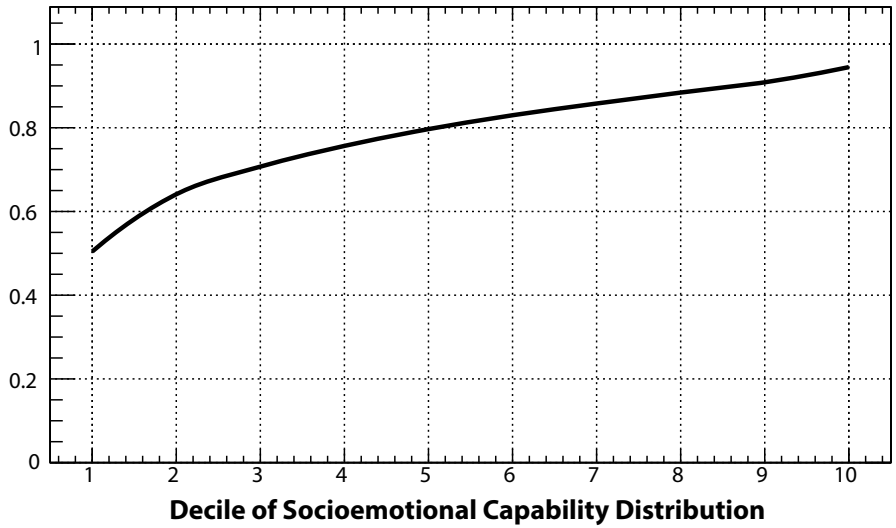
Probability of daily smoking by age 18 (males)



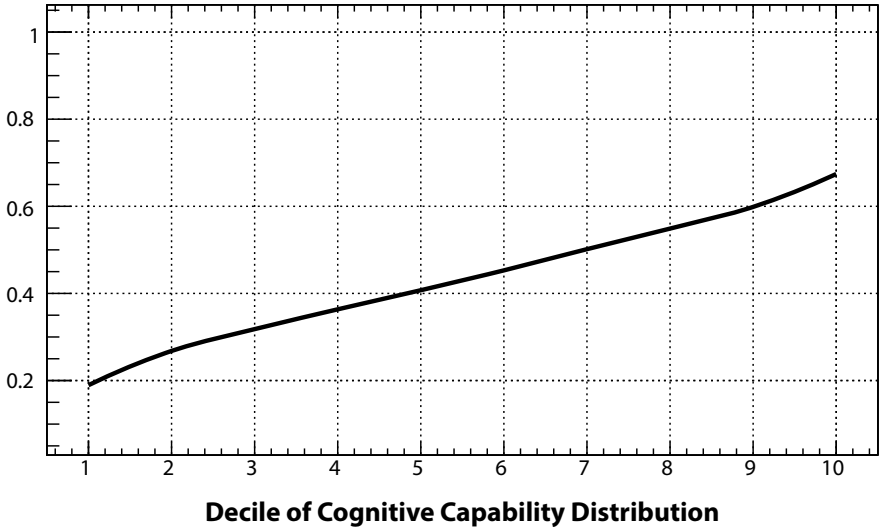
Notes: The data are simulated from the estimates of the model and our NLSY79 sample. We use the standard convention that higher deciles are associated with higher values of the variable. The confidence intervals are computed using bootstrapping (200 draws).

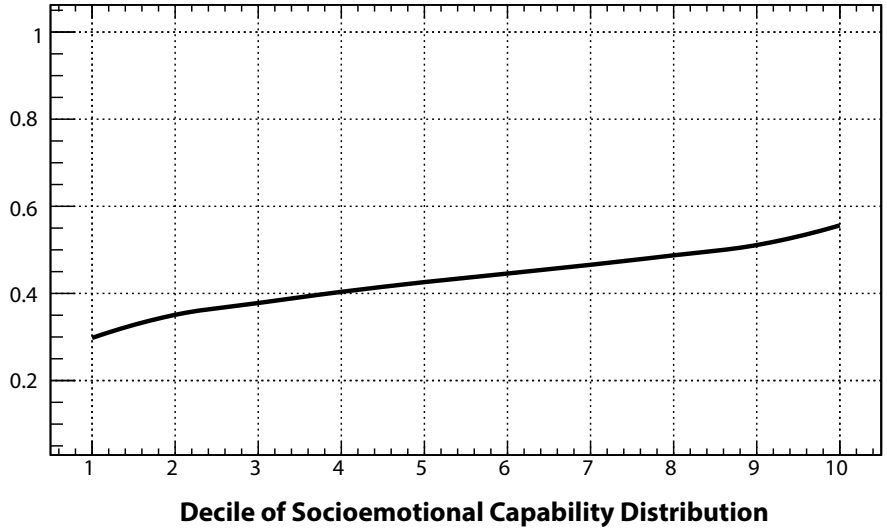
Cognitive and Socioemotional Factors: Probability of Graduating from Secondary School, Males



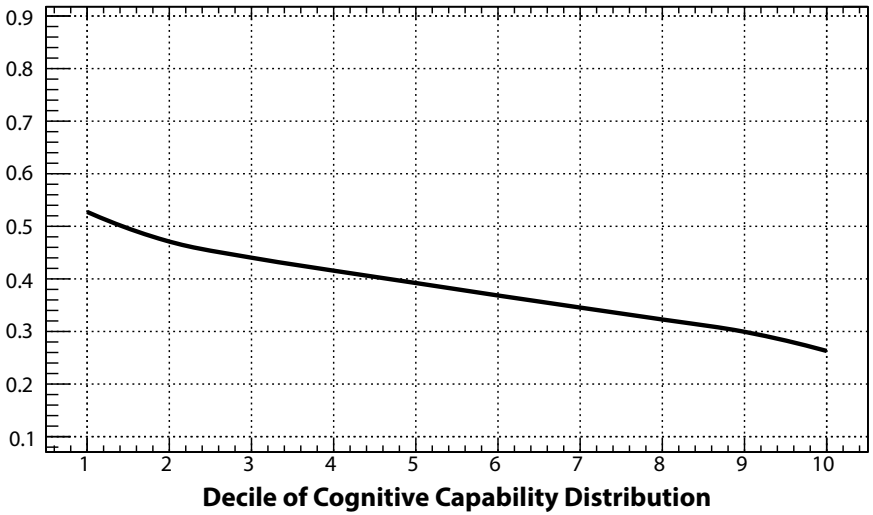


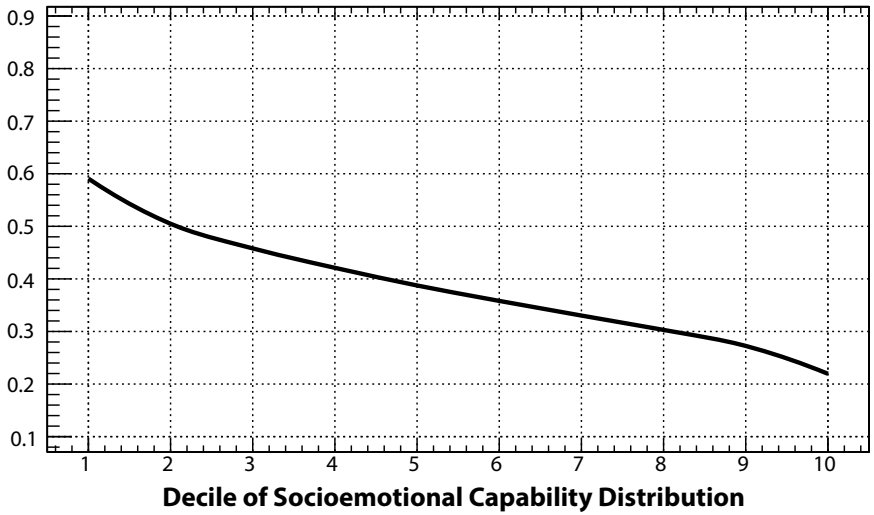
The Effect of Cognitive and Socioemotional Endowments on Probability of White-Collar Occupation



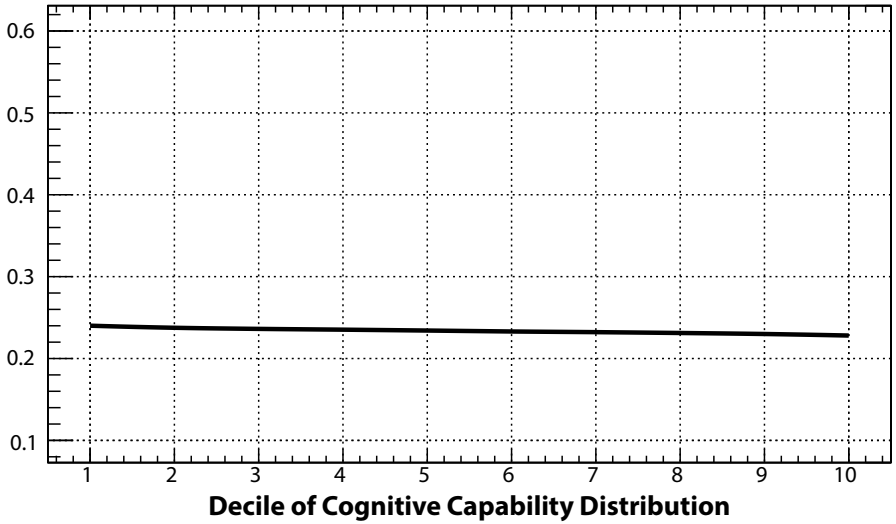


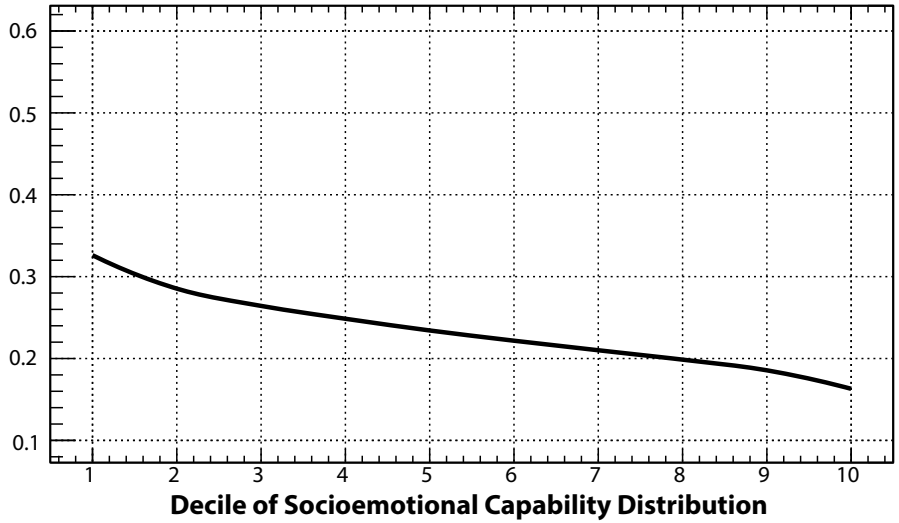
The Effect of Cognitive and Socioemotional Endowments on Smoking



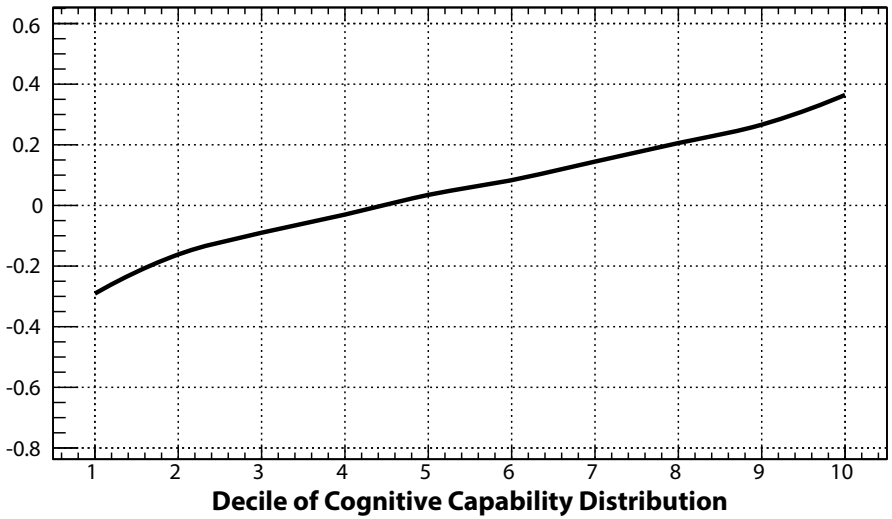


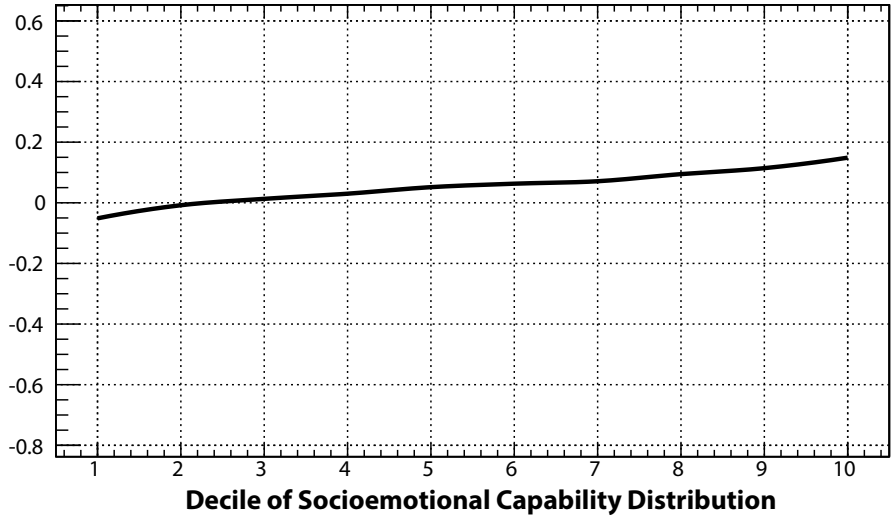
The Effect of Cognitive and Socioemotional Endowments on Heavy Drinking During Adulthood



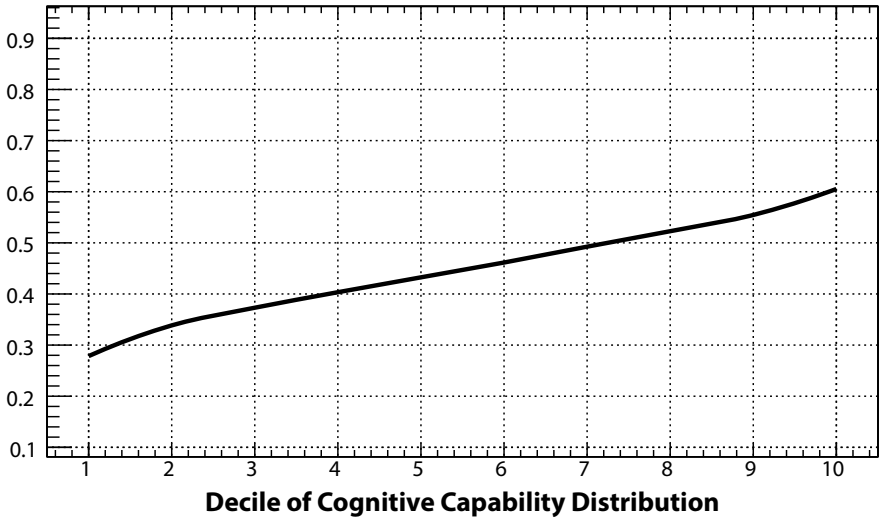


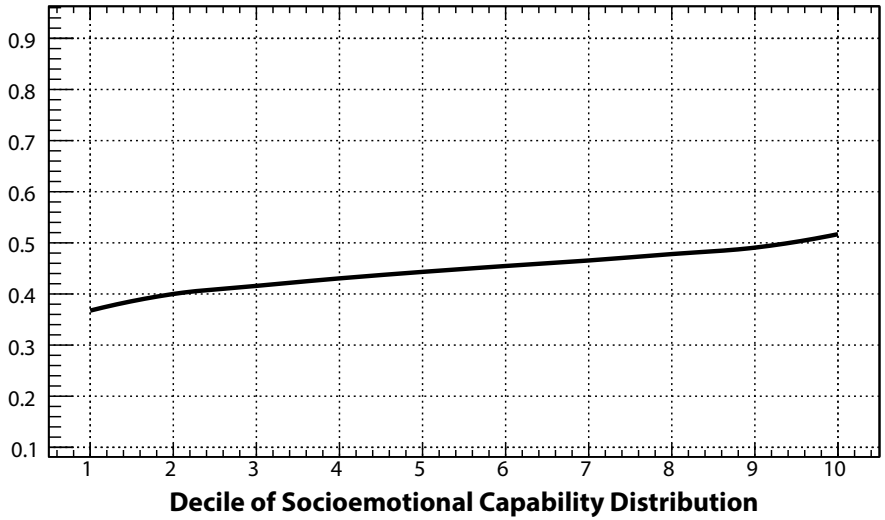
The Effect of Cognitive and Socioemotional Endowments on Pearlin's "Personal Mastery Scale": Sense of Self-Mastery



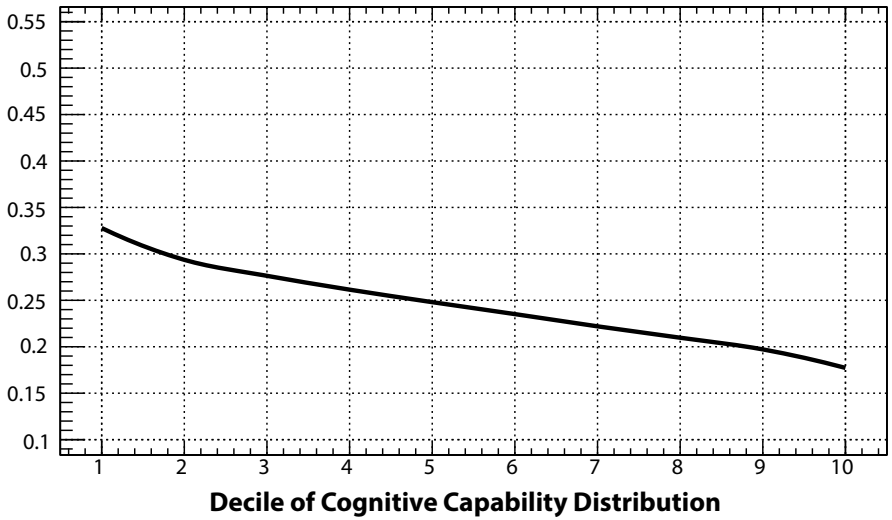


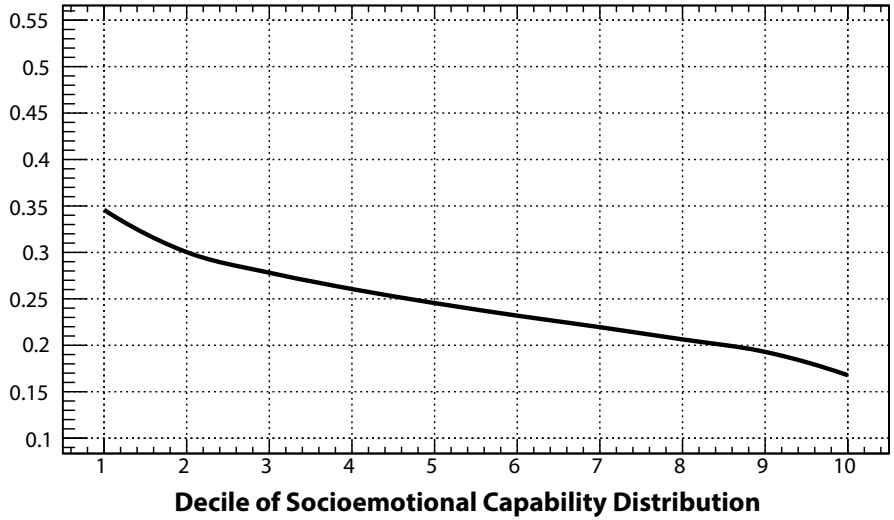
The Effect of Cognitive and Socioemotional Endowments on Trusting People (2008)





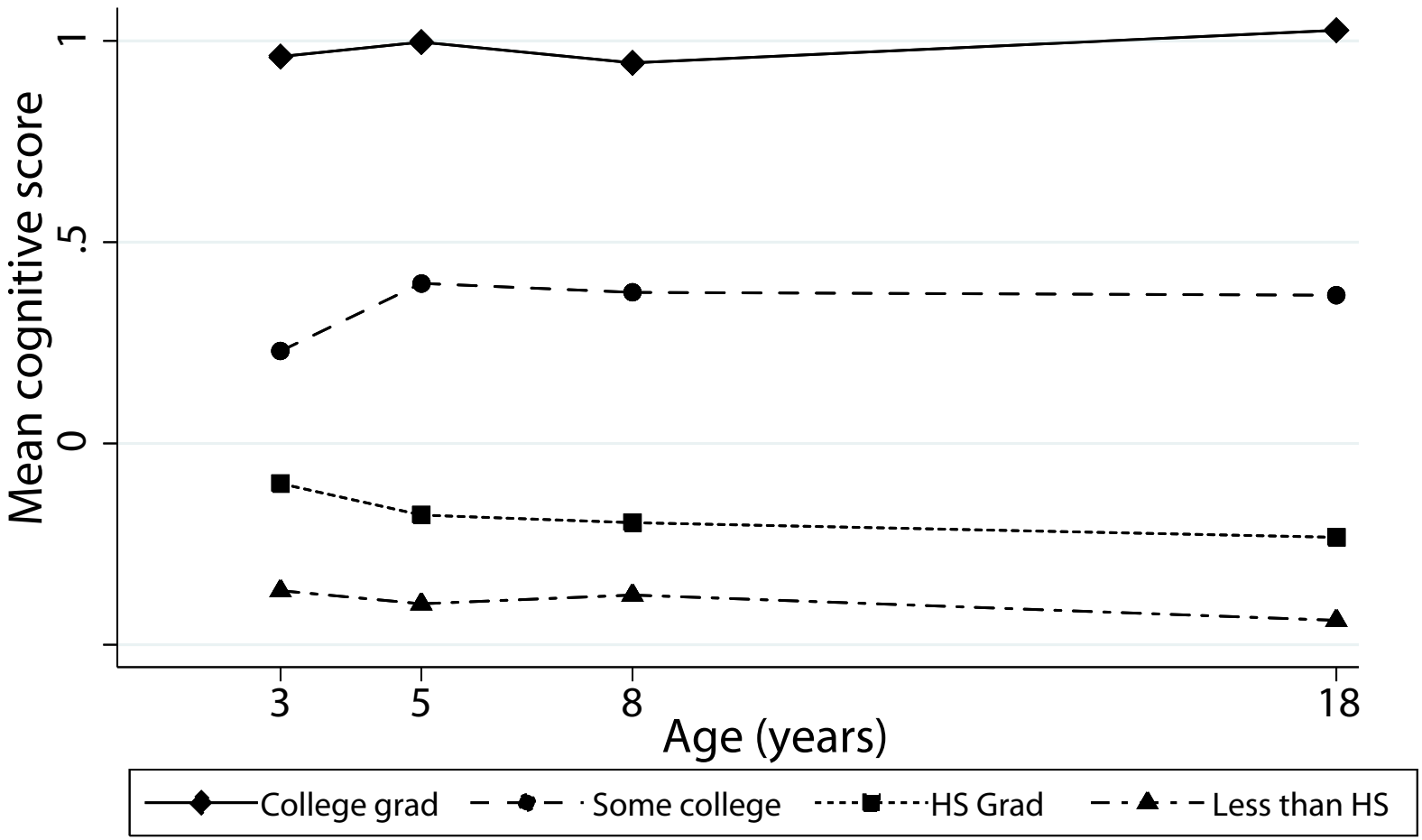
The Effect of Cognitive and Socioemotional Endowments on Ever Divorced





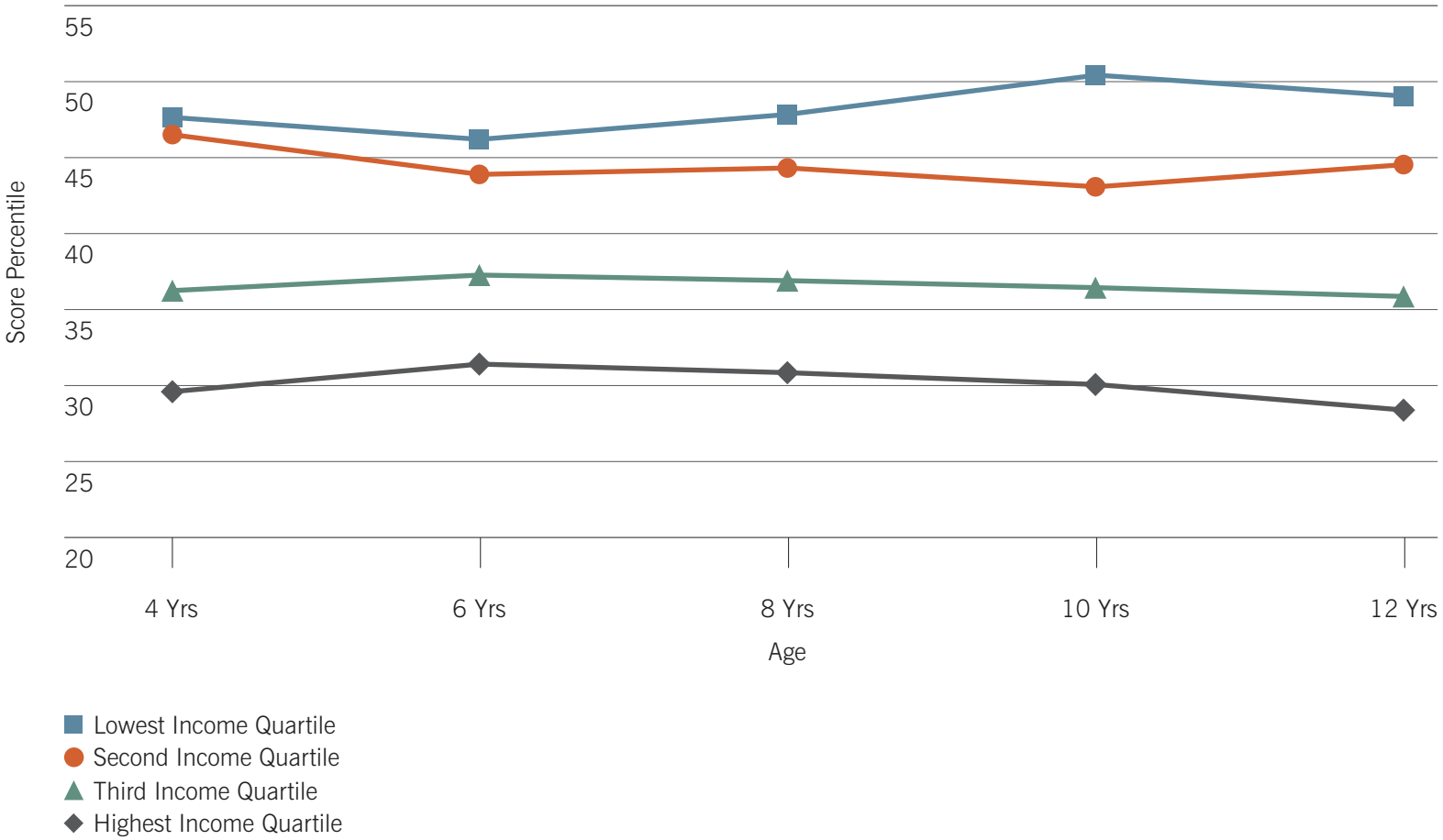
Gaps In These Capabilities Open Up Early

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).

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



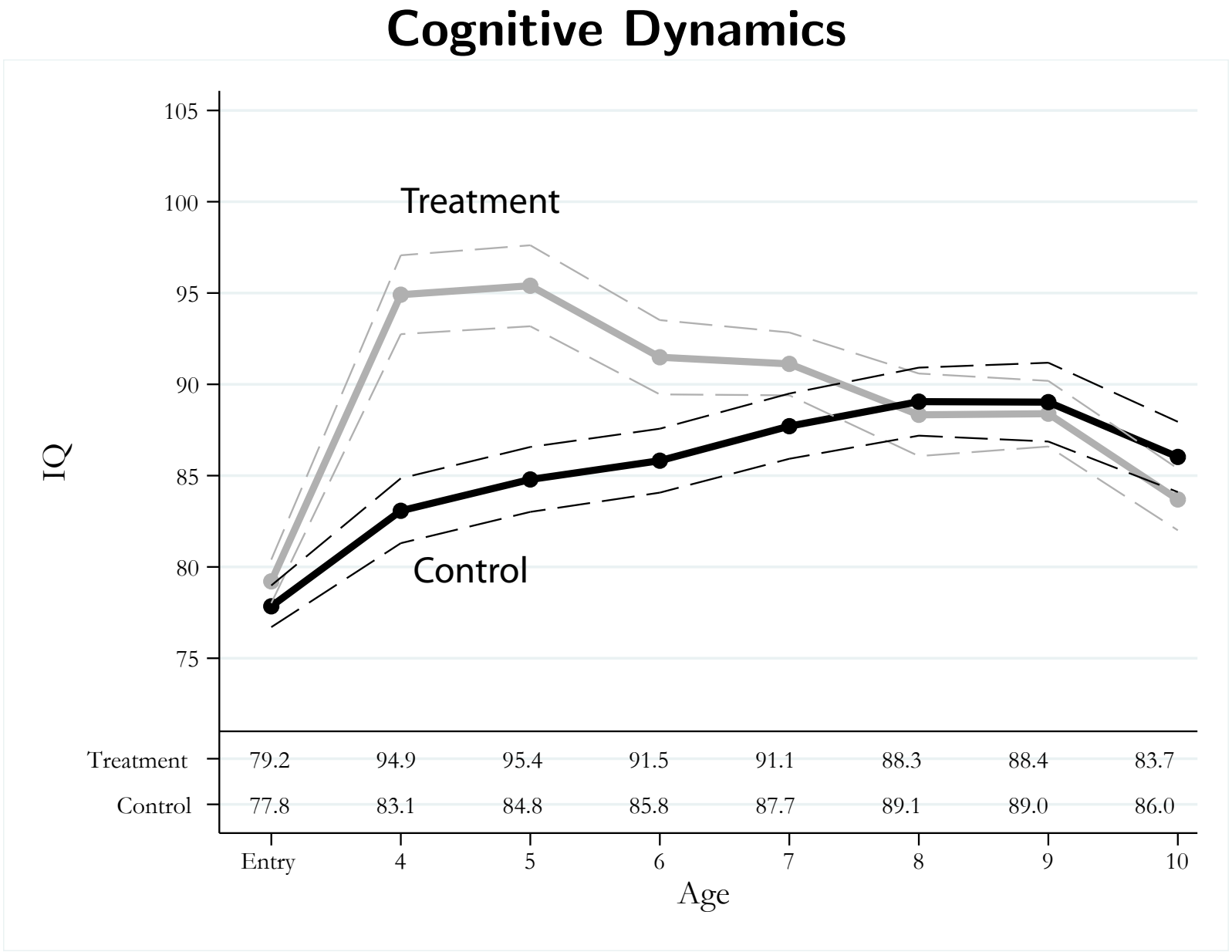
How to Interpret This Evidence

- 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?
- 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.

HighScope Perry Preschool Program

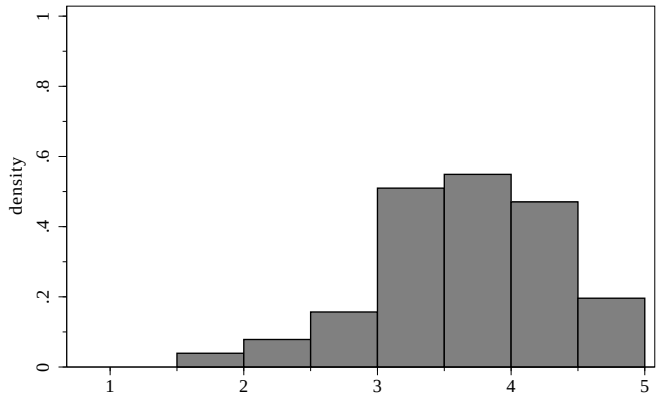
- The Perry preschool program enriched the lives of low income black children with initial IQs below 85 at age 3.
  - $2\frac{1}{2}$ hours per day
  - 5 days per week
  - 2 years during each school year (mid-October to May).
  - home visits
  - program stops after two years
- Focused on "Plan—Do—Review."
  (Teach children to plan a task, to stay on the task, and to review it — a strong and personal social skills component.)
- Also had visits with parents one day a week.

Cognitive Evolution Through Time, Perry Males

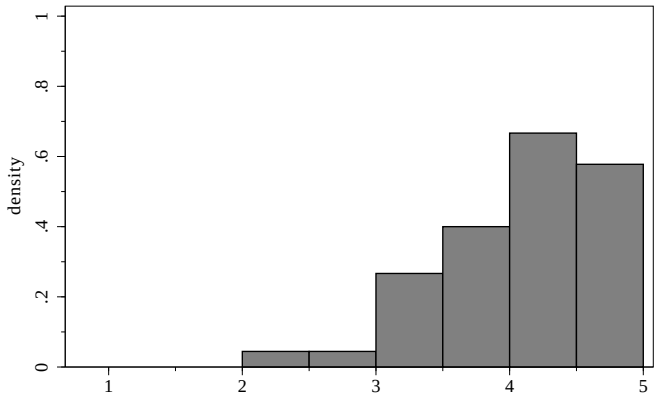


Histograms of Indices of Personality Skills and CAT scores

(a) Externalizing Behavior, Control

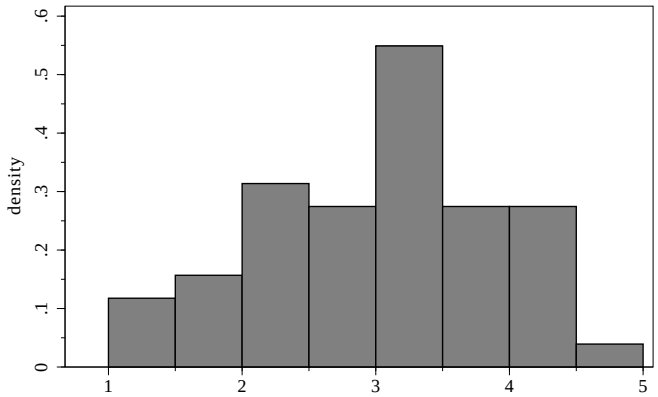


(b) Externalizing Behavior, Treatment

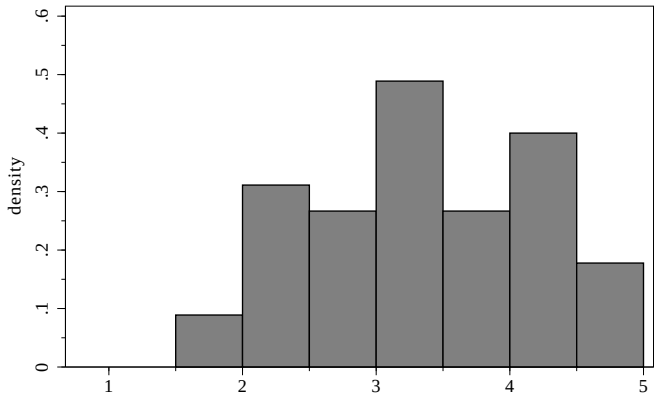


Histograms of Indices of Personality Skills and CAT scores

(c) Academic Motivation, Control

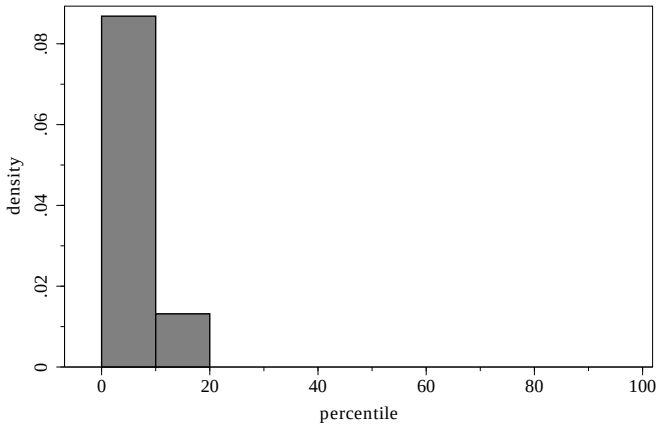


(d) Academic Motivation, Treatment

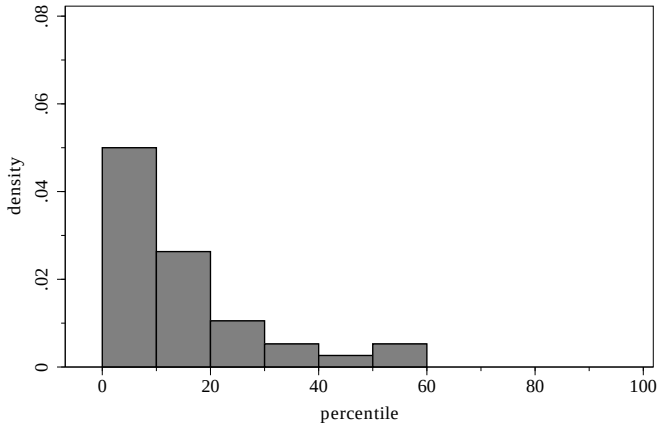


Histograms of Indices of Personality Skills and CAT scores

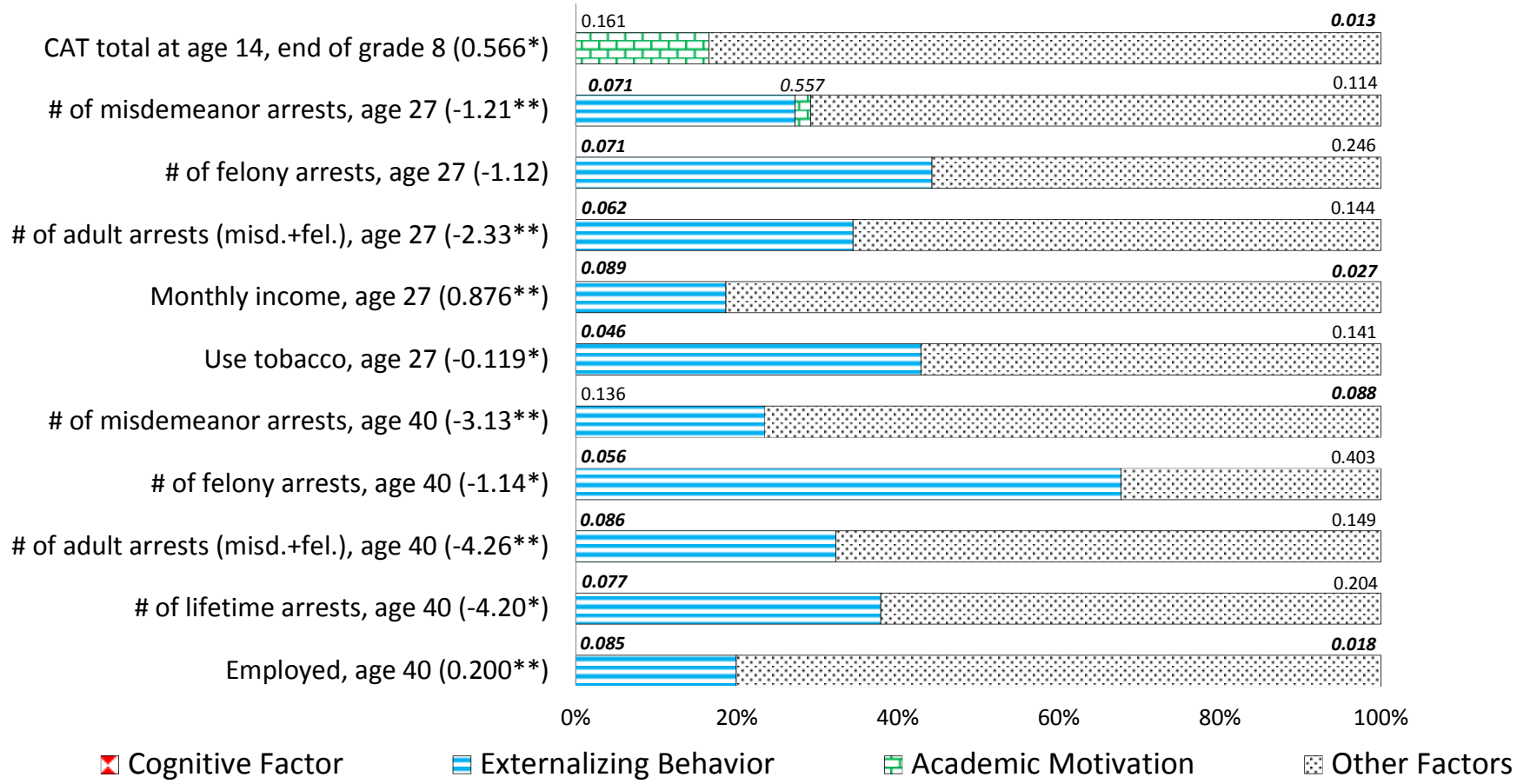
(e) CAT total at age 14, Control



(f) CAT total at age 14, Treatment

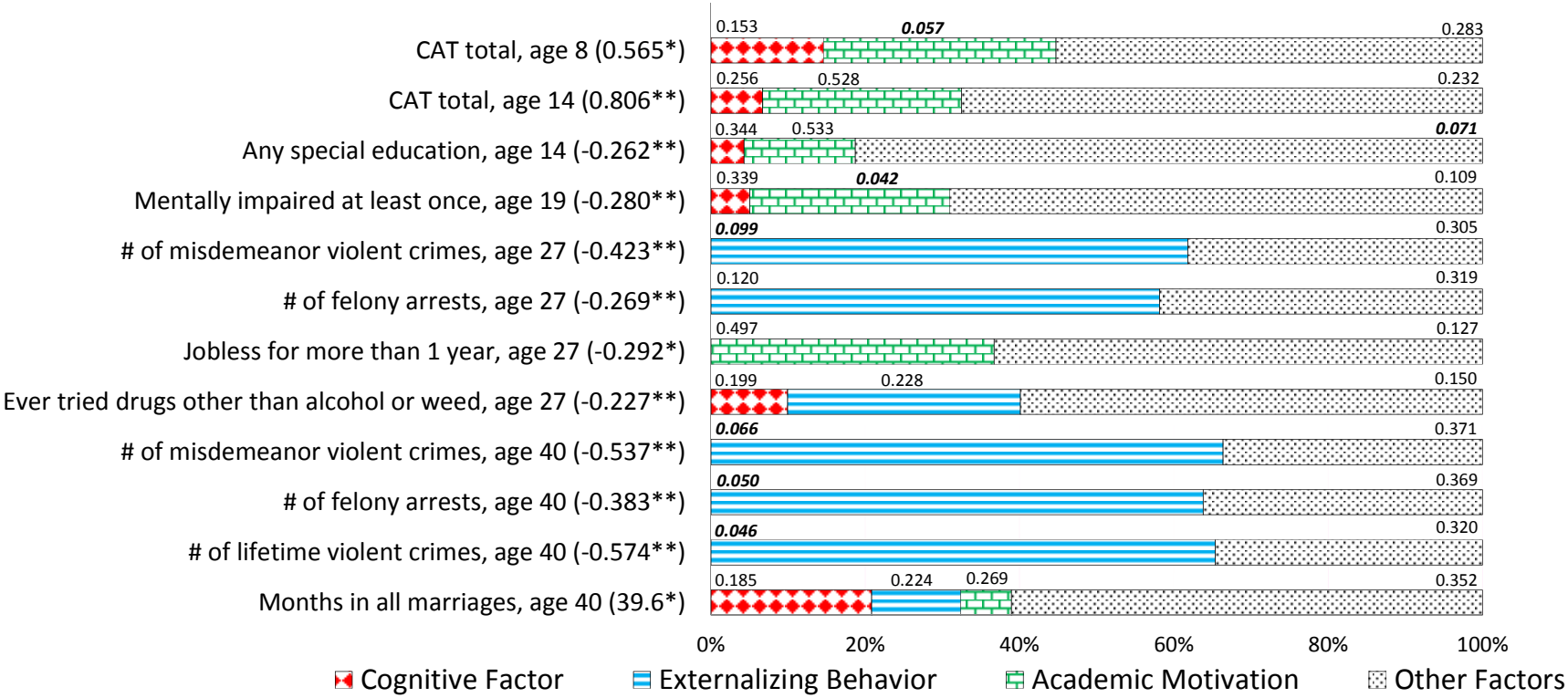


Decompositions of Treatment Effects on Outcomes, Males



Notes: The total treatment effects are shown in parentheses. Each bar represents the total treatment effect normalized to 100 percent. One-sided *p*-values are shown above each component of the decomposition. "CAT total" denotes California Achievement Test total score normalized to control mean zero and variance of one. Asterisks denote statistical significance: * – 10 percent level; ** – 5 percent level; *** – 1 percent level. Monthly income is adjusted to thousands of year-2006 dollars

Decompositions of Treatment Effects on Outcomes, Females



Notes: The total treatment effects are shown in parentheses. Each bar represents the total treatment effect normalized to 100 percent. One-sided *p*-values are shown above each component in each outcome. "CAT total" denotes California Achievement Test total score normalized to control mean zero and variance of one. Asterisks denote statistical significance: * – 10 percent level; ** – 5 percent level; *** – 1 percent level.

Perry Preschool Project			
Variable Description	**Control Mean**	**Diff. Means**	***p*-value**
Behavioral Risk Factors			
Never drunk without permission by age 15 (F)	0.682	0.152	**0.040**
Never smoked marijuana by age 27 (F)	0.364	0.156	**0.089**
Drinks alcohol never or once in a while at age 27 (F)	0.773	0.107	**0.013**
Always wears a seat belt at age 27 (M)	0.359	0.227	**0.045**
Non-smoker at age 27 (M)	0.462	0.119	**0.080**
Non- or light drinker (<3 glasses/time) at age 27 (M)	0.778	0.156	**0.070**
Always wears a seat belt at age 40 (M)	0.618	0.182	**0.080**
Non-smoker at age 40 (M)	0.472	0.161	**0.020**
Any change in diet in past 15y at age 40 (M)	0.229	0.151	**0.018**
Regular physical activity in past month at age 40 (F)	0.091	0.284	**0.002**
Never got a traffic ticket in past 15y at age 40 (M)	0.265	0.269	**0.086**
Health Care Coverage			
Never w/o health insurance in past 15y at age 40 (F)	0.682	0.068	**0.044**
Yrs w/o health insurance in past 15y at age 40 (F)	1.045	-0.587	**0.056**
Health			
Never classified as mentally impaired by age 19 (F)	0.636	0.280	**0.036**
No. of sick days in bed in past 12m at age 27 (F)	8.455	-5.175	**0.035**

- Carolina Abecedarian Program also effective.
- A main mechanism is noncognitive skills

Abecedarian Project Project			
Variable Description	**Control Mean**	**Diff. Means**	***p*-value**
Behavioral Risk Factors			
Started smoking by age 15 (parent report) (M)	0.190	-0.114	**0.064**
First tried marijuana before age 17 (F)	0.393	-0.233	**0.053**
First drink before age 17 (F)	0.571	-0.291	**0.047**
Always wears a seat belt at age 21 (F)	0.500	0.220	**0.028**
Started smoking regularly before age 17 (M) (M)	0.304	-0.189	**0.030**
Carried a gun last 30 days at age 21 (M)	0.304	-0.304	**0.006**
Has drank and driven in past month at age 21 (F)	0.222	-0.102	**0.042**
n a physical fight last 12m at age 21 (F)	0.741	-0.261	**0.018**
No. snacks/hamburgers yesterday at age 21 (F)	2.286	-0.846	**0.020**
Physical activity in past week at age 21 (F)	0.071	0.249	**0.012**
Attempted suicide in past 12m at age 21 (F)	0.179	-0.179	**0.011**
Health Care Coverage			
Covered by health insurance at age 21 (F)	0.429	0.411	**0.004**
Covered by health insurance at age 30 (M)	0.476	0.228	**0.088**
Health			
BMI at age 1 (M)	18.107	-1.539	**0.007**
Sick a lot in last 3y at age 15 (M)	0.429	-0.317	**0.031**
BSI Depression score at age 21 (F)	59.643	-5.601	**0.002**
Diastolic BP in mid-30s (M)	92.000	-13.474	**0.025**
Diastolic BP in mid-30s (F)	89.227	-3.894	**0.031**
Systolic BP in mid-30s (M)	143.333	-17.544	**0.038**
Systolic BP in mid-30s (F)	135.636	-5.970	**0.010**
HDL Cholesterol in mid-30s (M)	42.000	11.211	**0.009**
Triglycerides in mid-30s (M)	170.167	-61.956	**0.037**

The Jamaican Study

- The 1986-87 Jamaican Study enrolled 129 stunted children age 9-24 months that lived in poor disadvantaged neighborhoods of Kingston, Jamaica (Walker et al., 1990).
- Gave psychosocial stimulation to growth-retarded toddlers living in poverty in Jamaica in the late 80's.
- The intervention was a one-hour weekly visit from a community health worker over a 2-year period that taught and encouraged mothers to interact and play with their children in ways that would develop their children's cognitive and socio-emotional skills.
- Large effects on earnings of a randomized intervention that gave cognitive and socioemotional stimulation to stunted toddlers living in poverty.
- Nutritional supplement effects were transient. Stimulation substantially increased average earnings and employment for both genders.
- Treatment group earnings caught-up to the earnings of a matched non-stunted comparison group.
- The findings show that simple socio-emotional stimulation early in childhood in disadvantaged settings can have a substantial effects on labor market outcomes and reduce inequality later in life.
- A main mechanism is through personality skills.

Figure 1 : Log Monthly Earnings– Treatment Effect

Treatment and Control Distributions for Average Log Monthly Earnings

Control is dotted line, Treatment solid one. K-S test P-values are 0.04(Average), 0.04 (Average Full Time), 0.02 (Average Non Temp)

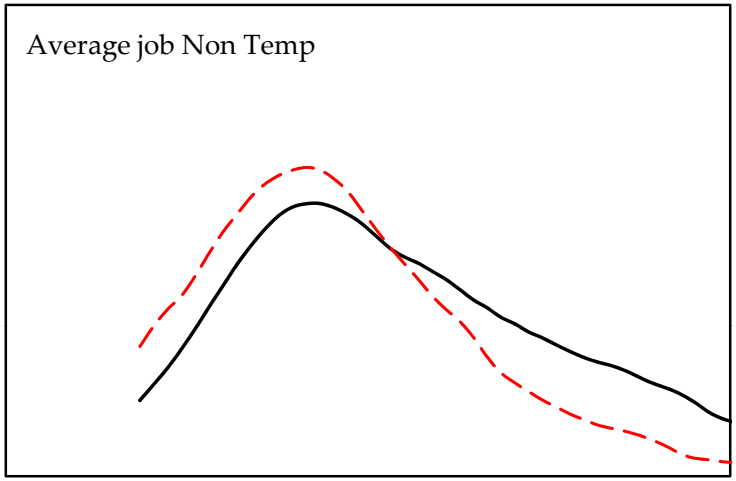
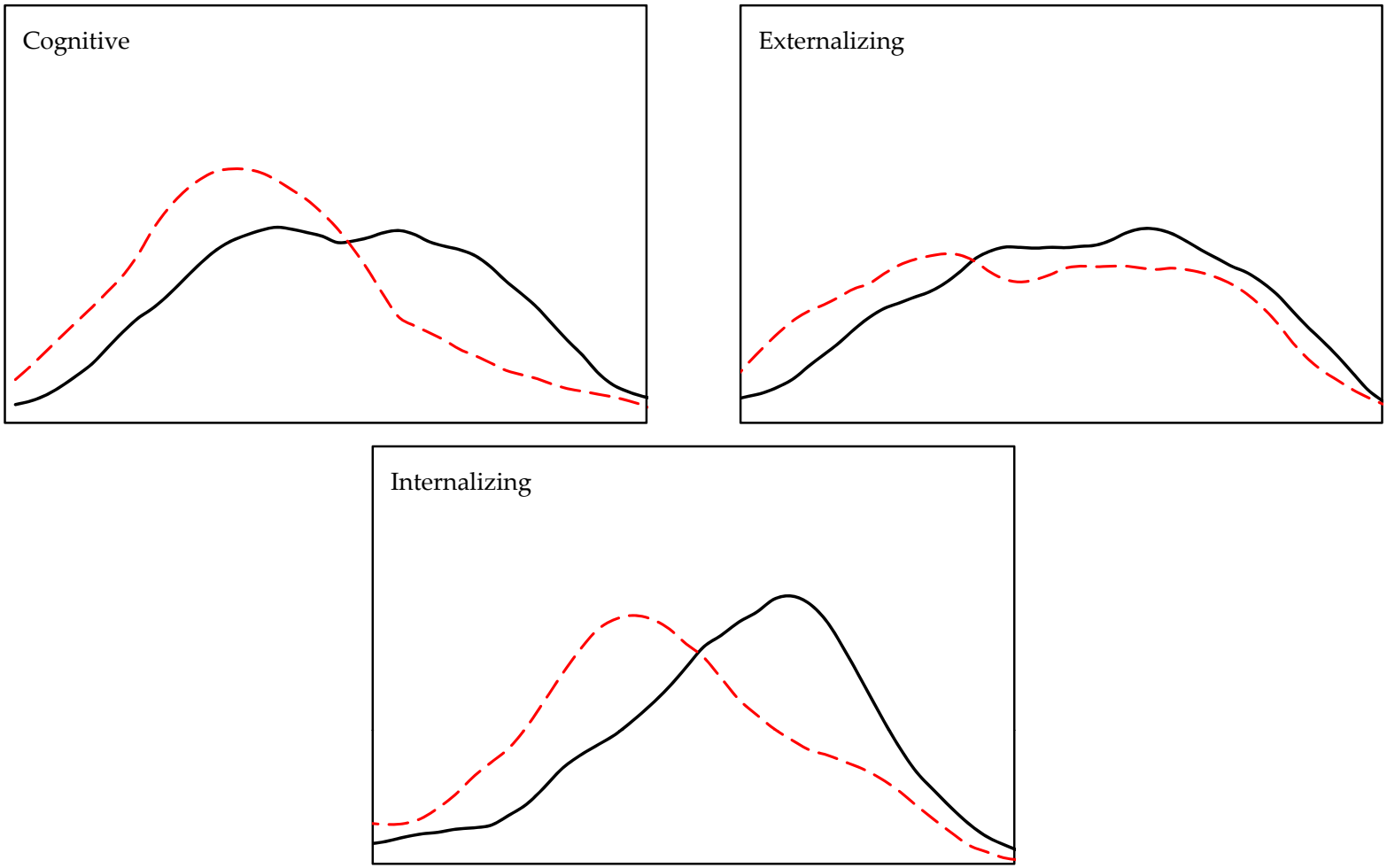


Figure 2 : Skills, Treatment Effect

Treatment and Control Distributions of Skills

Control is dotted line, Treatment solid one. K-S test P-values are 0.01(Cognitive), 0.00 (Internalizing) and 0.17 (Externalizing)



Understanding the Dynamics of Capability Formation: Capabilities Beget Capabilities

i. Based on a modern understanding of the life cycle of capability formation.

ii. Capability formation is dynamic in nature–capabilities beget capabilities. Stocks of capabilities cross fertilize other capabilities.

iii. **Dynamic and Static Complementarities**.

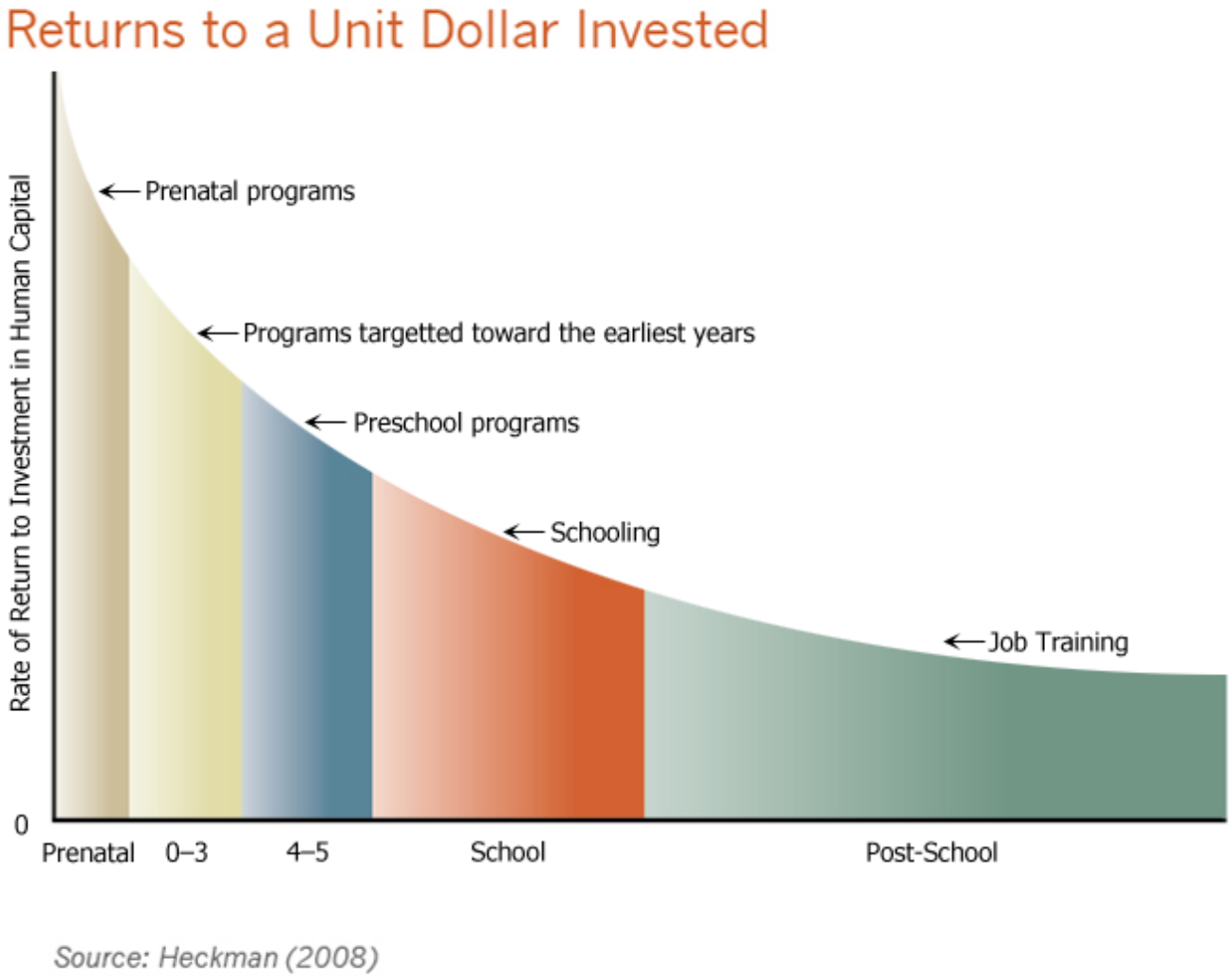
Capabilities Enhance Each Other: Technology of Capability Formation

Capabilities at later ages $= \phi$ (Capabilities today, investments, environments)

Personality and Social Capabilities	→	Cognitive Capabilities, Healthy Behaviors, Health Capabilities
(sit still; pay attention and stay focused; engage in learning; open to experience)		
Health Capabilities	→	Cognitive Capabilities, Personality Capabilities
(fewer lost school days; ability to concentrate, basic IQ, motor and perceptual competencies)		
Cognitive Capabilities	→	Produce better health practices; produce more motivation and openness to experience; greater perception of rewards
(child better understand and controls its environment)		
Outcomes		Increase productivity in a variety of aspects of life, higher income, better health, more family investment, upward mobility, more social engagement, reduced social costs

Static Complementarity

Dynamic Complementarity



Source: Heckman (2008).

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

What Should We Do for The Disadvantaged Adolescents Who Do Not Receive Skill-Enhancing Enriched Early Environments And Have Cognitive Deficits?

Recommendations

- Measure the full set of capabilities that produce life success
- Avoid an exclusive focus on achievement test or IQ scores
- Recognize the dynamics of human skill formation
- Understand the synergisms among the capabilities
- Recognize the importance of the early years in shaping the foundations of later success
- The malleability of skills changes with age
- Cognitive skills (IQ) much less malleable after ages 10-12
- Personality skills much more malleable until later ages
- Recognize that adolescent interventions, to be successful, should target the more malleable noncognitive skills