

The Productivity Argument For Investing in Young Children

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Why Invest In Poor Children?

The traditional argument is based on fairness and social justice

Our argument is that in addition to these benefits, there are benefits for society at large

- Reduction in crime
- Reduction in welfare benefit use
- Improvement in efficiency of schools

Why Early Childhood Interventions?

- Skill acquisition is a dynamic process: skill begets skill
- Raises productivity of schools and firms
- Adult remediation programs have a poor track record
- There is strong evidence for critical or sensitive periods for learning

Slowdown in the Labor Force

- Slowdown in the growth of the quantity of skilled workers
- Slowdown in the growth of the quality of workers
- The effective high school dropout rate counting GEDs as dropouts (as you should) has increased

Table 1
Educational Characteristics of the Labor Force
Aged 25 and Over
1980, 2000, 2020

	Labor Force in 1980	Growth 1980-2000	Labor Force in 2000	Growth 2000-2020	Labor Force in 2020
Education					
Less Than High School	17.3	-5.3	12.0	0.9	12.9
High School Only	31.5	6.3	37.8	3.8	41.6
Some Schooling Beyond High School	13.8	19.1	32.9	6.2	39.1
College Degree or More	17.3	18.5	35.8	7.7	43.5
Total	79.8	38.7	118.5	18.6	137.1
% With College Degree	21.6%		30.2%		31.7%

*Assumes that subsequent cohorts have same education at age 25 as the cohort age 25 in 2000.

Source: Ellwood (2001).

Literacy and Numeracy from IALS

- Over 20% of the US workforce is functionally illiterate, compared to about 10% in Germany and Sweden

Crime

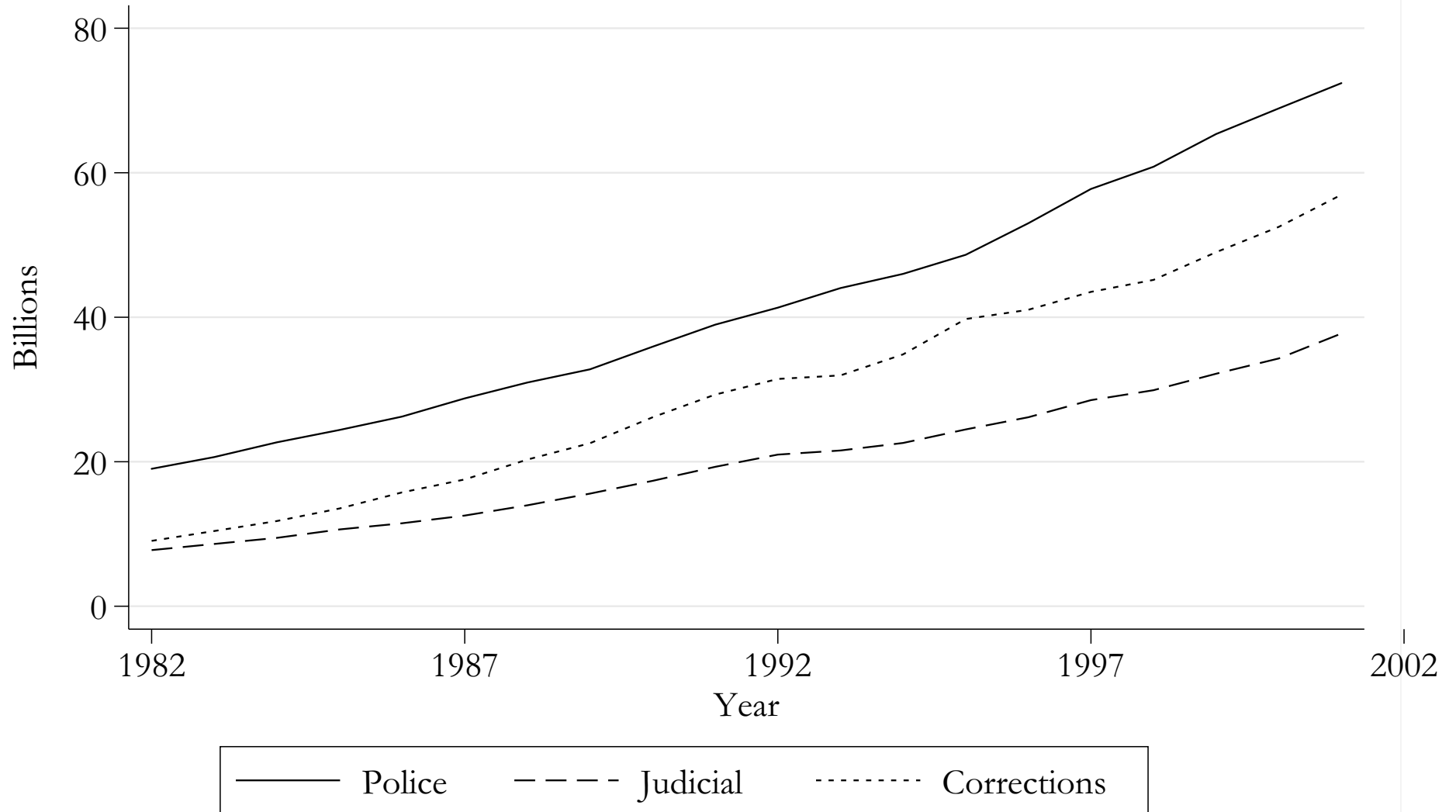
- Anderson (1999) finds that the **net** cost of crime is \$1.3 T per year
- Per capita cost is \$4,818 per year
- Violent and property crime levels are still high, despite large declines in recent years
- Crime reduction is **extremely** expensive
- Spending on the criminal justice system is still increasing

Table 2. Aggregate Burden Of Crime

Crime-induced Production (\$ billion)	464
Opportunity Costs (\$ billion)	152
Risks to Life And Health (\$ billion)	672
Transfers (\$ billion)	706
Gross Burden (\$ billion)	1,995
Net of Transfers (\$ billion)	1,289
Per Capita (\$)	4,818

Source: Anderson (1999). All figures inflated to \$2004 using the CPI.

Figure 1
Total Direct Expenditures By Criminal Justice Function, 1982–2001

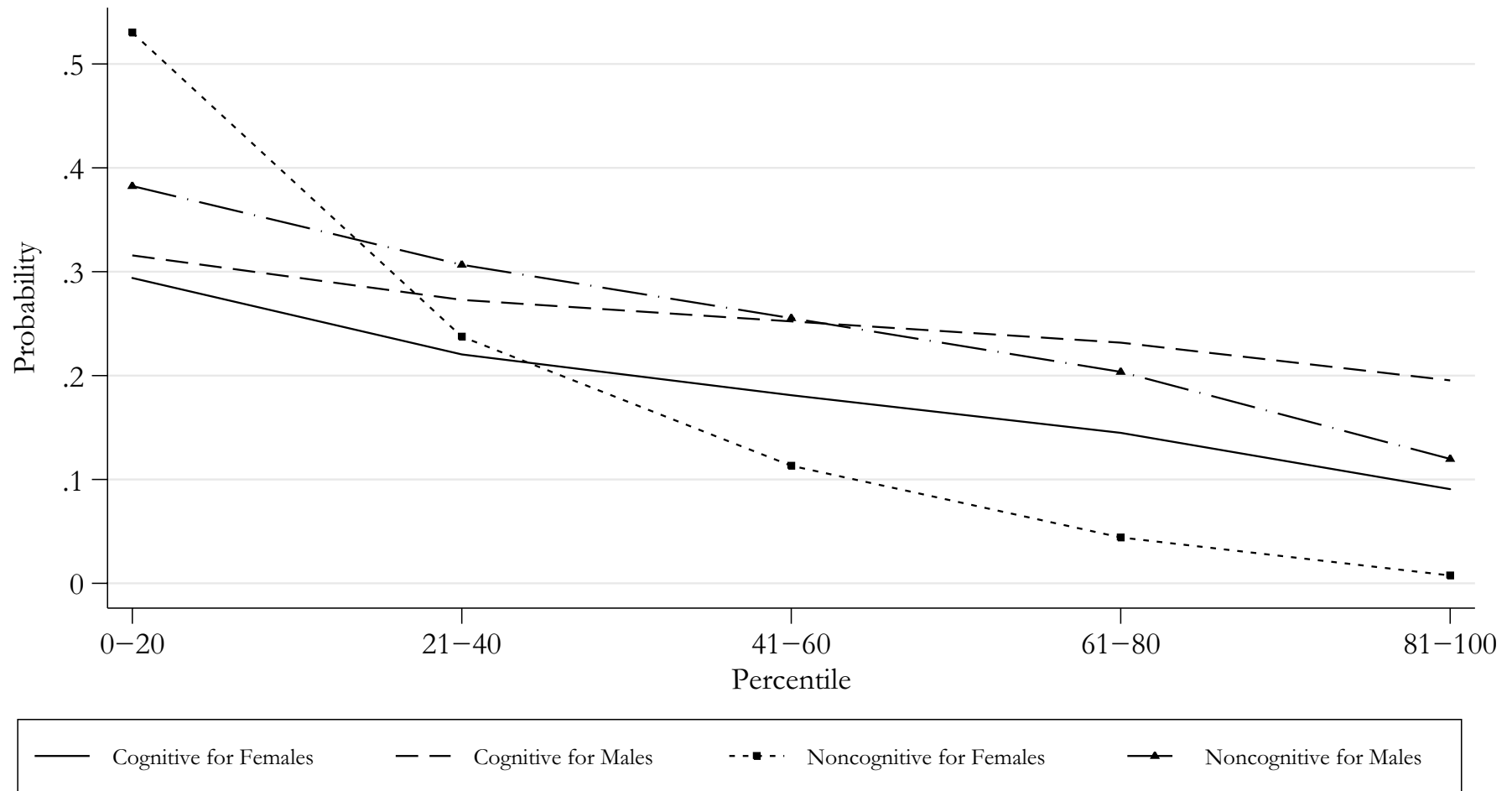


Source: Justice Expenditure and Employment Extracts.

Ability And Outcomes

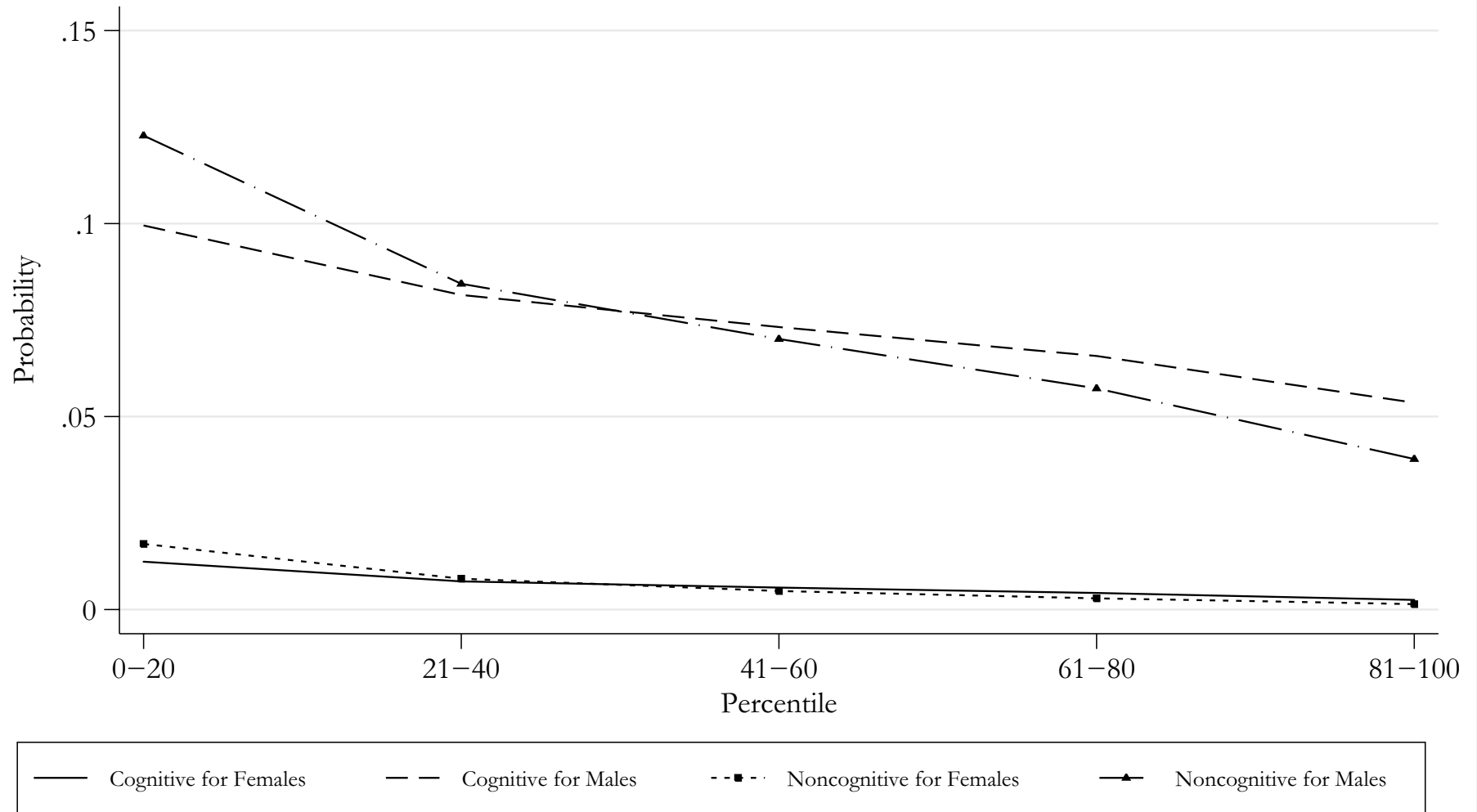
- Cognitive and noncognitive ability are important in explaining schooling, crime and a variety of other outcomes

Figure 2A
 Probability of Being a High School Dropout and Increased Ability



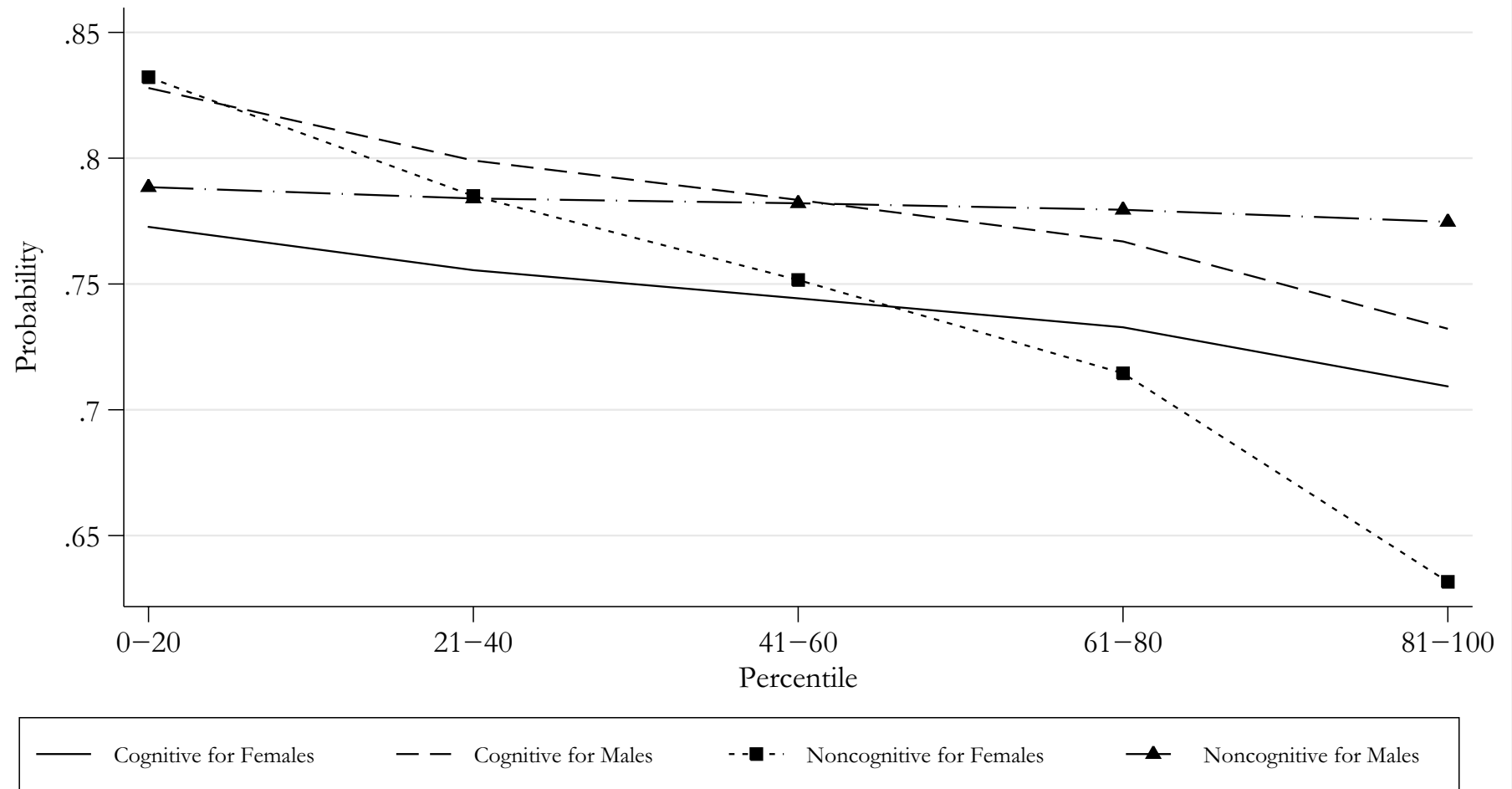
Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone with mean ability in the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability for someone with average cognitive ability. Source: Heckman, Stixrud, and Urzua (2004).

Figure 2B
 Probability of Spending Time in Jail by Age 30 and Increased Ability



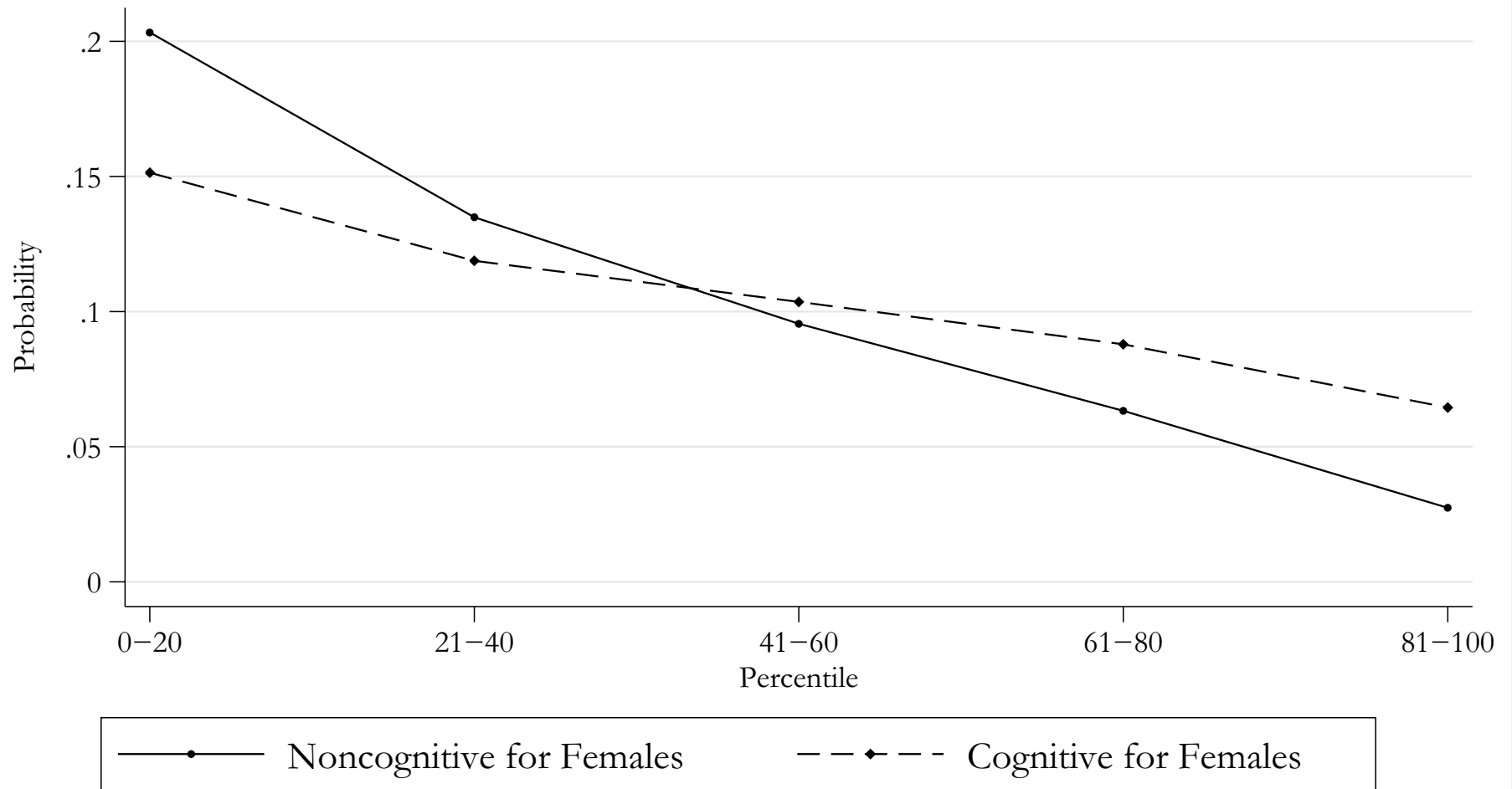
Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone with mean ability in the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability for someone with average cognitive ability. Source: Heckman, Stixrud, and Urzua (2004).

Figure 2C
Probability of Trying Smoking by Age 18 and Increased Ability



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone with mean ability in the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability for someone with average cognitive ability. Source: Heckman, Stixrud, and Urzua (2004).

Figure 2D
Probability of Being Single with Child and Increased Ability



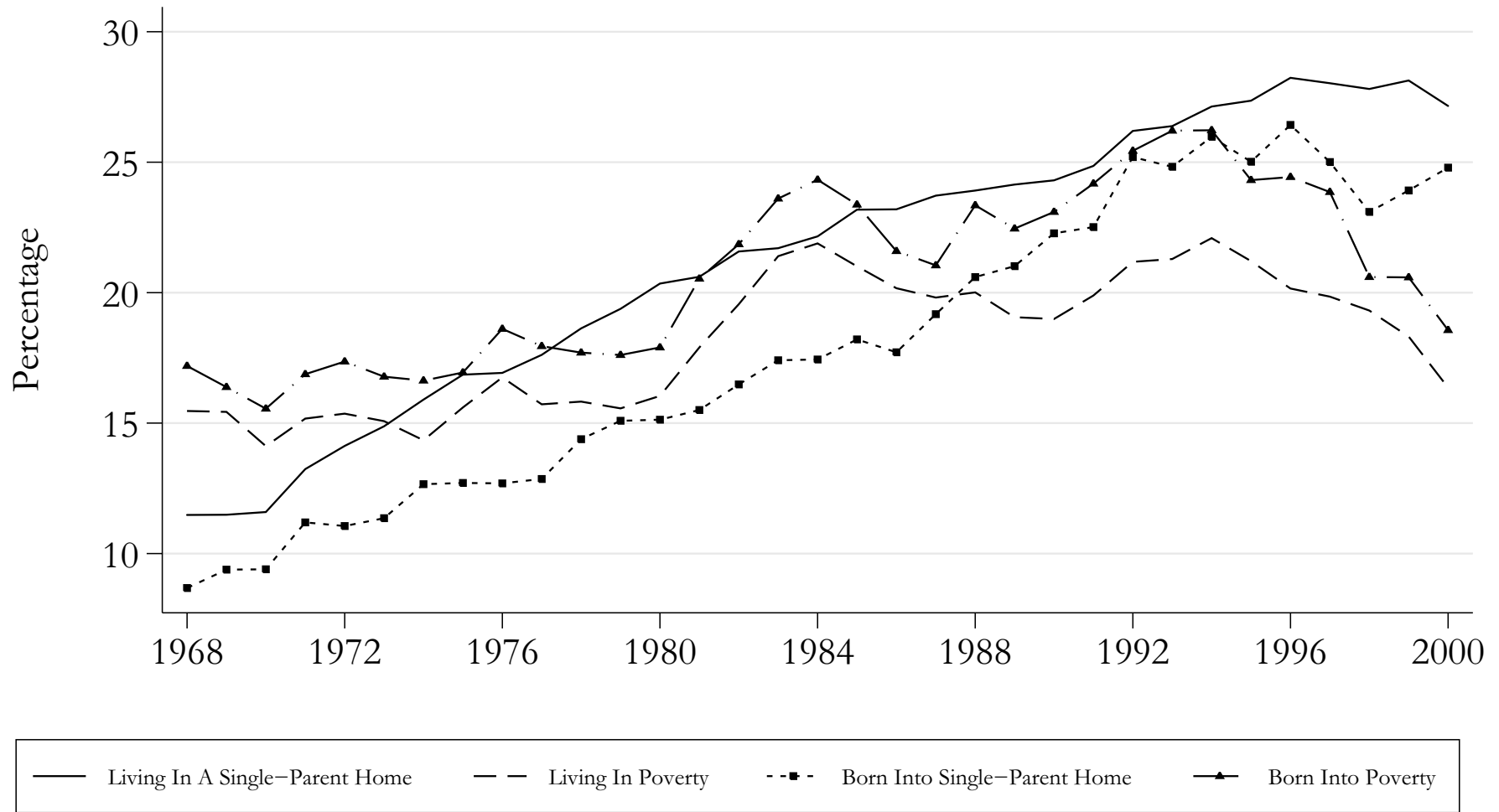
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Early Family Environments

- Major predictors of abilities (both cognitive and noncognitive)
- A major concern is that the quality of these environments has deteriorated over time

Figure 3

Percentage Of All Children Born Or Living In Adverse Environments In Each Year, 1968–2000

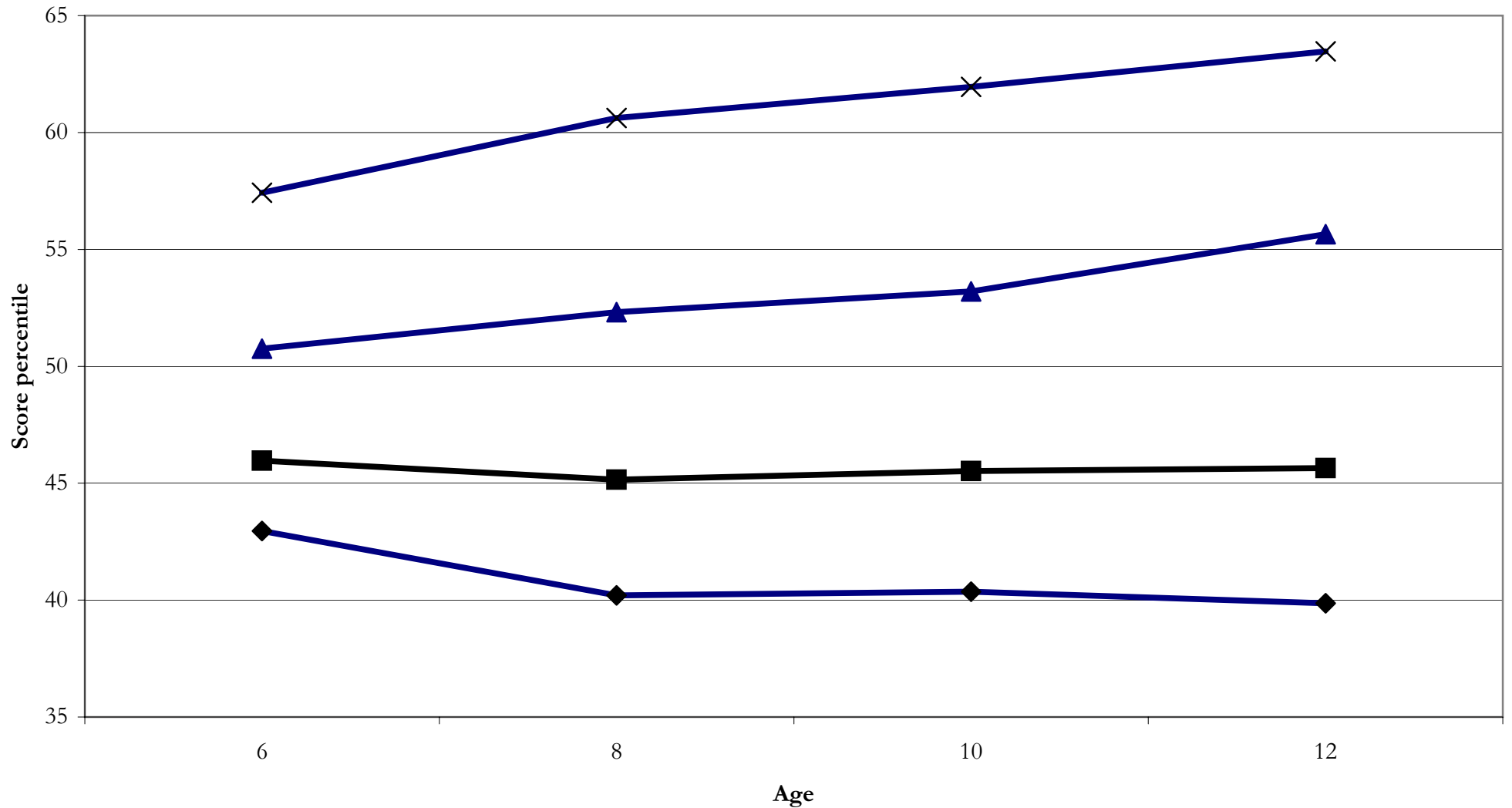


Source: Current Population Survey Annual March Supplement, 1968–2000. Poverty is defined as living in a household with income below the federal poverty line, which is adjusted for age and number of family members. Single-parent homes include cohabiting partners.

Gaps In Ability Open Up Early

Figure 4A Children of NLSY

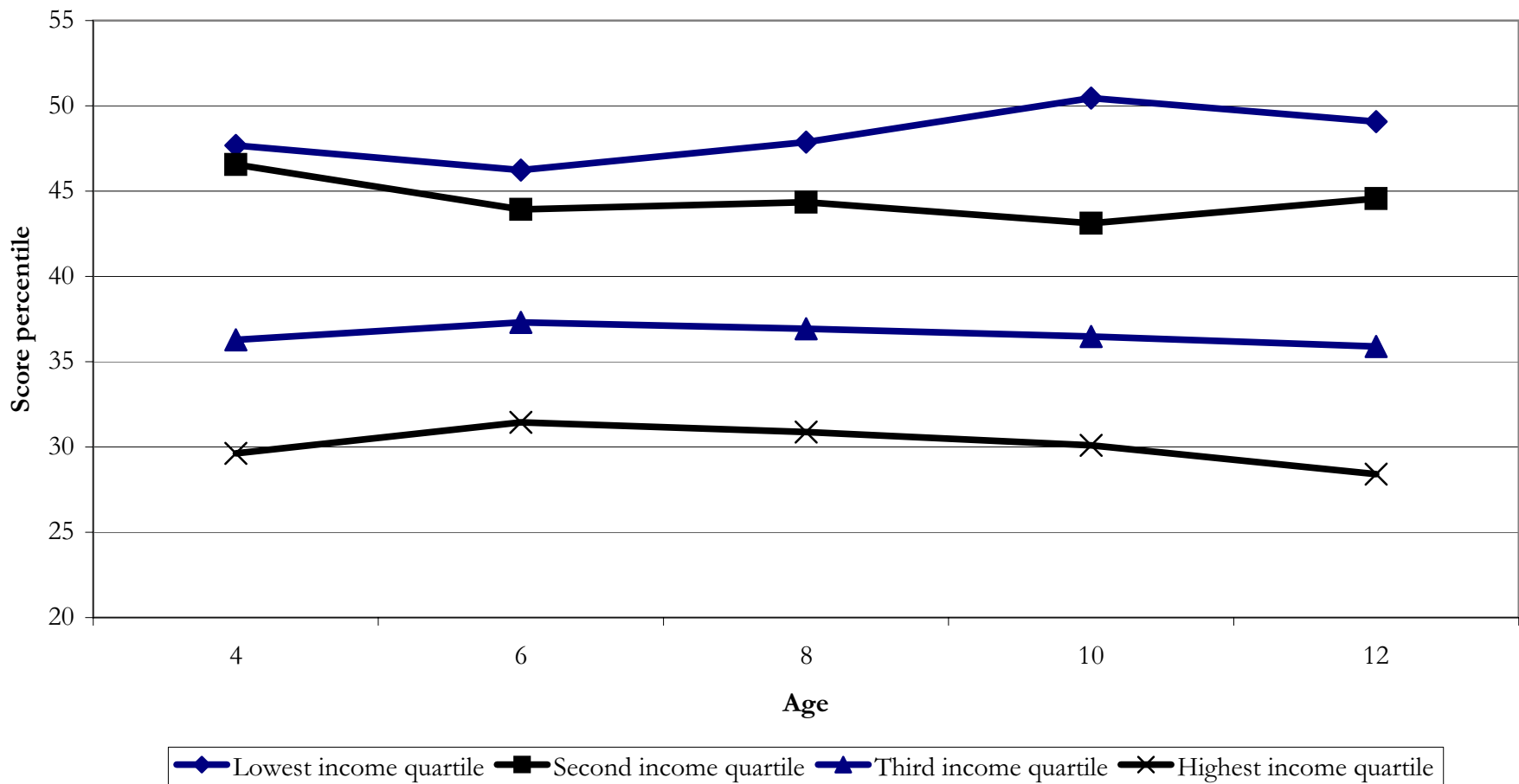
Average percentile rank on PIAT-Math score, by income quartile*



*Income quartiles are computed from average family income between the ages of 6 and 10.

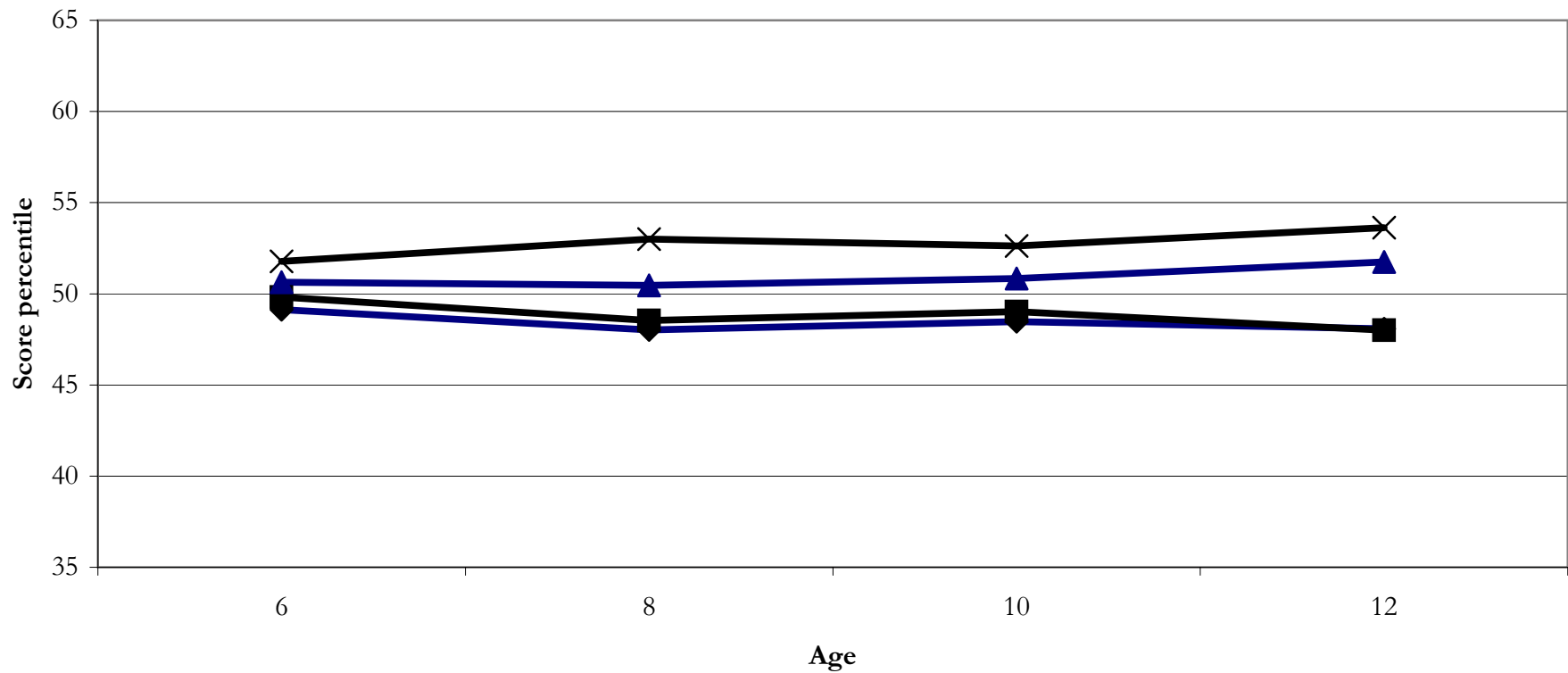
◆ Lowest income quartile ■ Second income quartile ▲ Third income quartile ✕ Highest income quartile

Figure 4B
Children of NLSY
Average percentile rank on anti-social score, by income quartile*



Once we control for family
background, the gaps in ability greatly
diminish

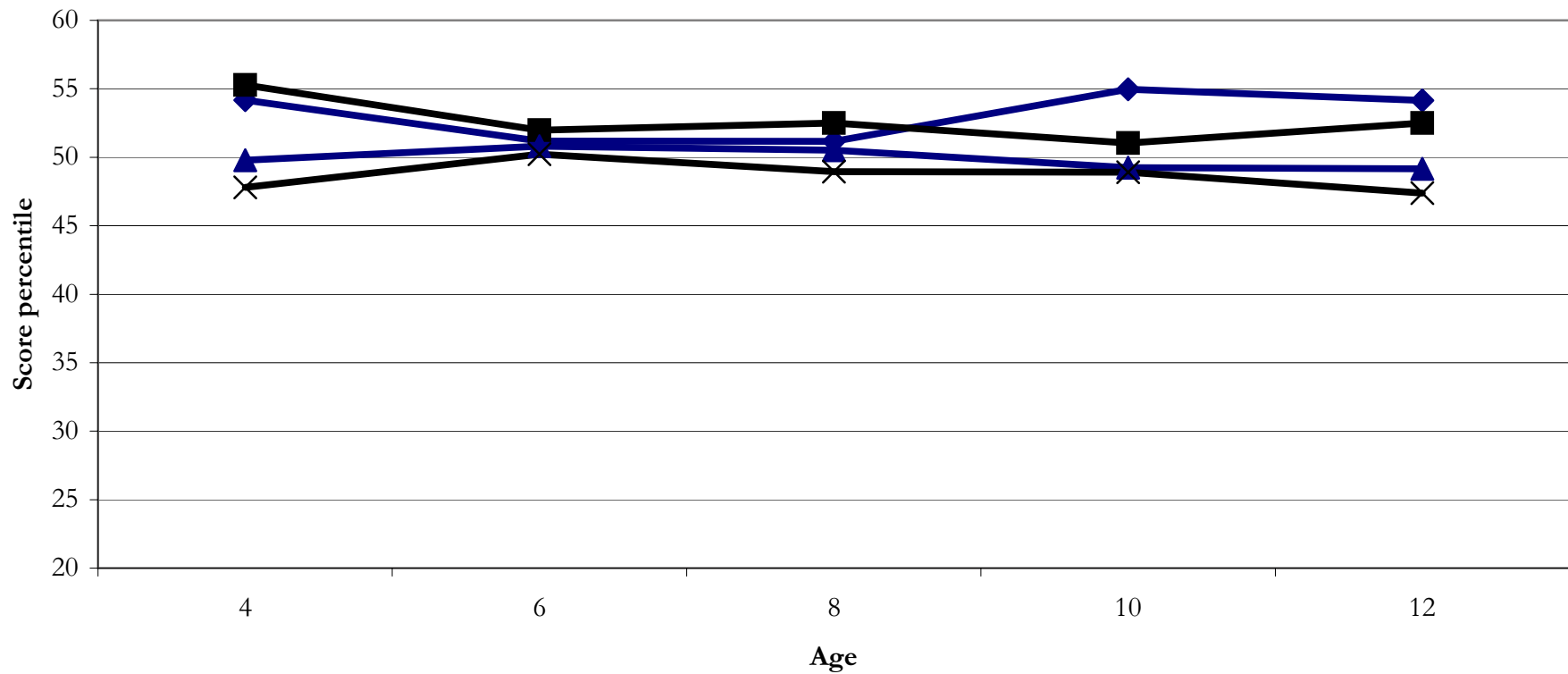
Figure 4C
Children of NLSY
Adjusted average PIAT-Math score percentiles by income quartile*



* Adjusted by maternal education, maternal AFQT (corrected for the effect of schooling) and broken home at each age

◆ Lowest income quartile ■ Second income quartile ▲ Third income quartile × Highest income quartile

Figure 4D
 Children of NLSY
 Adjusted average anti-social score percentile by income quartile*



* Adjusted by maternal education, maternal AFQT (corrected for the effect of schooling) and broken home at each age

◆ Lowest income quartile ■ Second income quartile ▲ Third income quartile ✕ Highest income quartile

- Experiments indicate that these relationships are causal
- Improvements in family environments enhance outcomes and affect both cognitive and noncognitive skills
- If we start early, we can even raise IQ

Figure 5A
Abecedarian IQ Scores Over Time

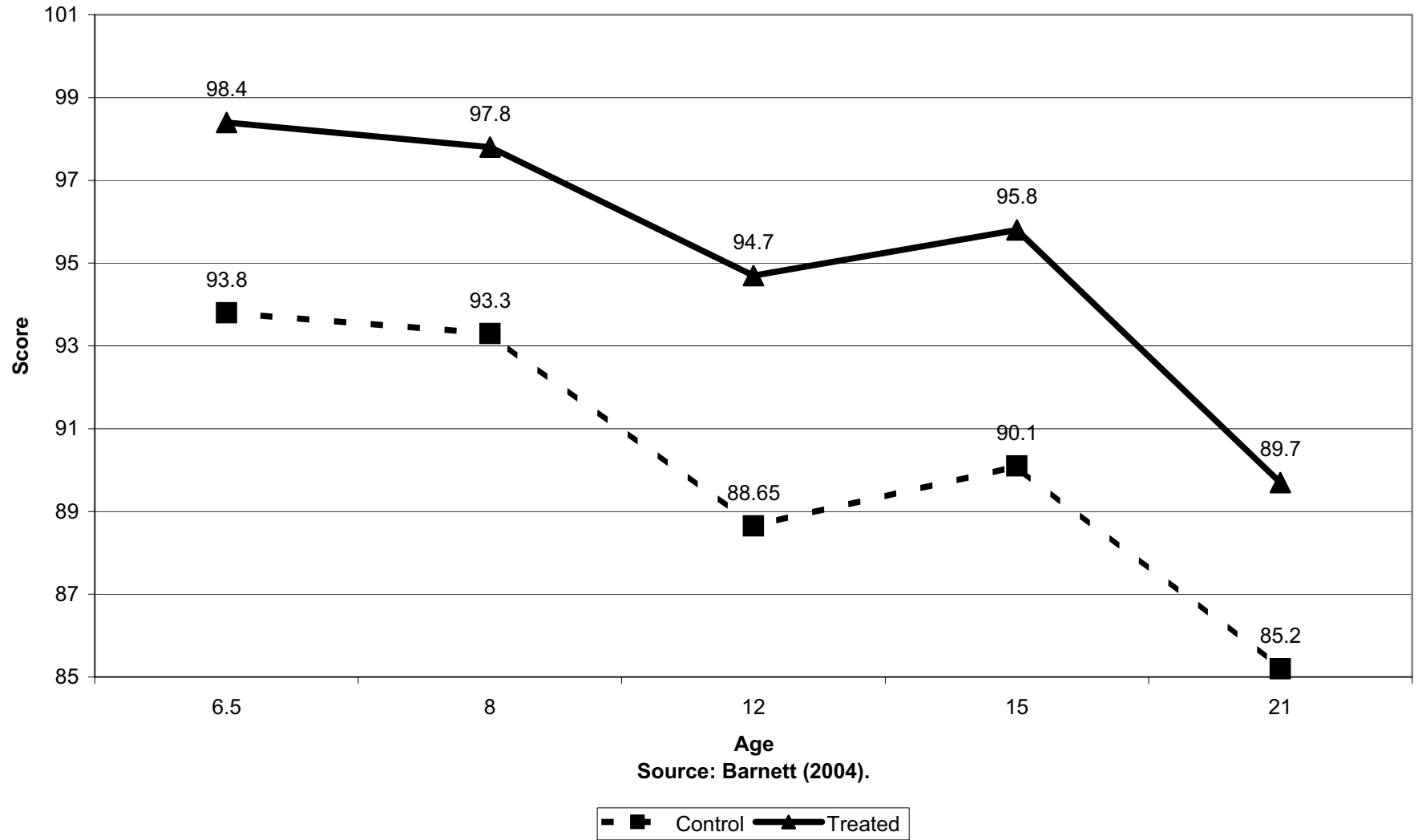


Figure 5B
Abecedarian Academic Outcomes

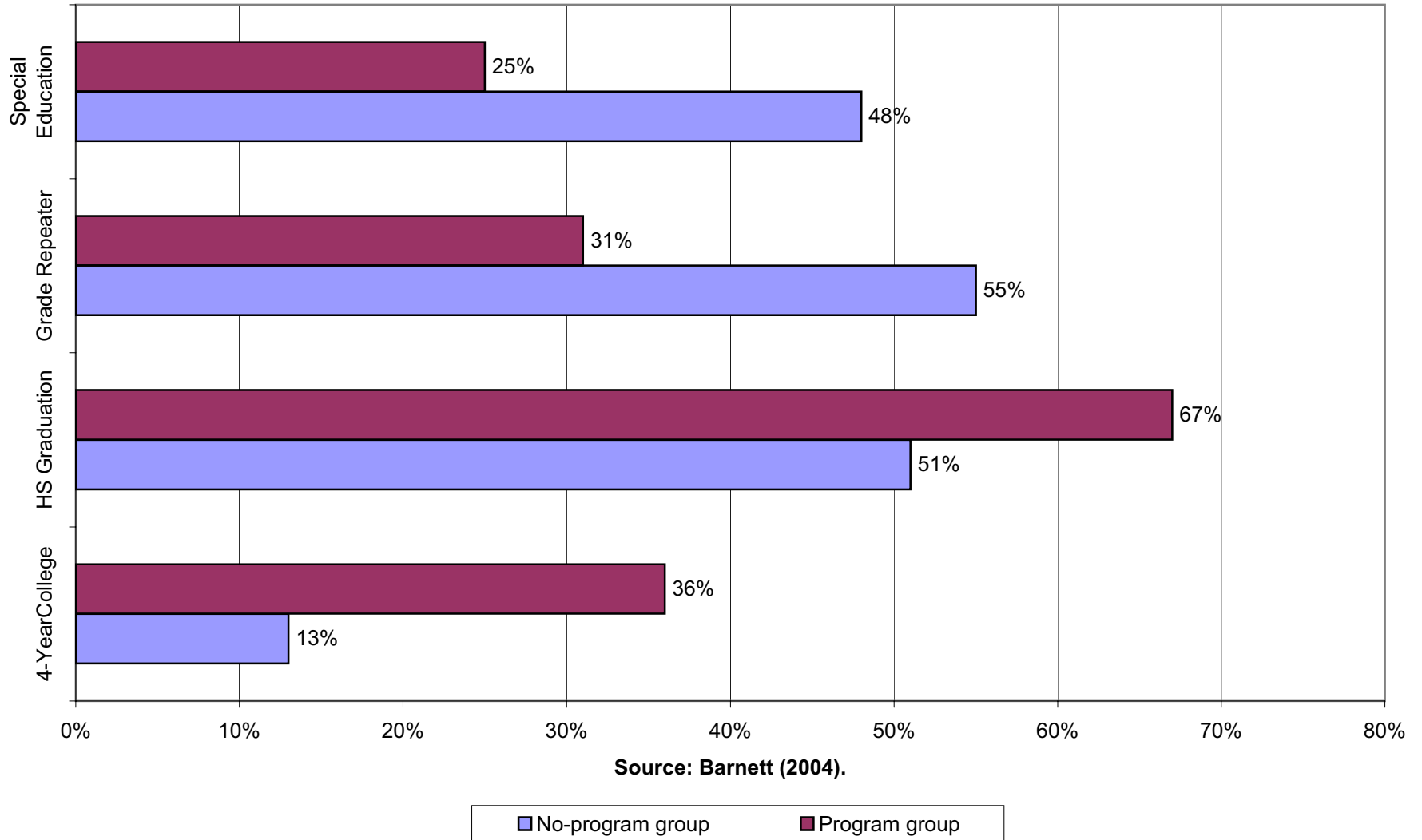


Table 3. Costs And Benefits of the Perry Preschool Program Per Participant

	Participants		General Public	
	Male	Female	Male	Female
Child Care:	997	997	0	0
Education:				
K-12	0	0	12,773	5,782
Up To Age 27	0	0	862	-2,444
Ages 28-40	39	-389	-164	-741
Ages 41-65*	0	0	0	0
Earnings:				
Up To Age 27	12,839	32,186	2,893	7,251
Ages 28-40	39,639	28,930	8,930	6,518
Ages 41-65*	11,802	16,561	1,979	3,400
Crime:				
Up To Age 27	0	0	195,254	9,973
Ages 28-40	0	0	131,610	3,639
Ages 41-65*	0	0	36,658	106
Welfare:				
Up To Age 27	-3,700	-2,443	5,107	3,372
Ages 28-40	-2,273	4,054	3,136	-5,594
Ages 41-65*	-1,733	1,684	2,391	-2,324
Total Benefits	57,609	81,578	401,430	28,936
Program Costs	0	0	16,683	16,683
Net Benefits	57,609	81,578	384,747	12,253

Note: Benefits and costs accruing after age 40 are projected. All figures are discounted at 3% and given in 2004 dollars.

Source: Belfield, Nores and Barnett (2004).

Figure 6A
Perry Preschool: IQ Over Time

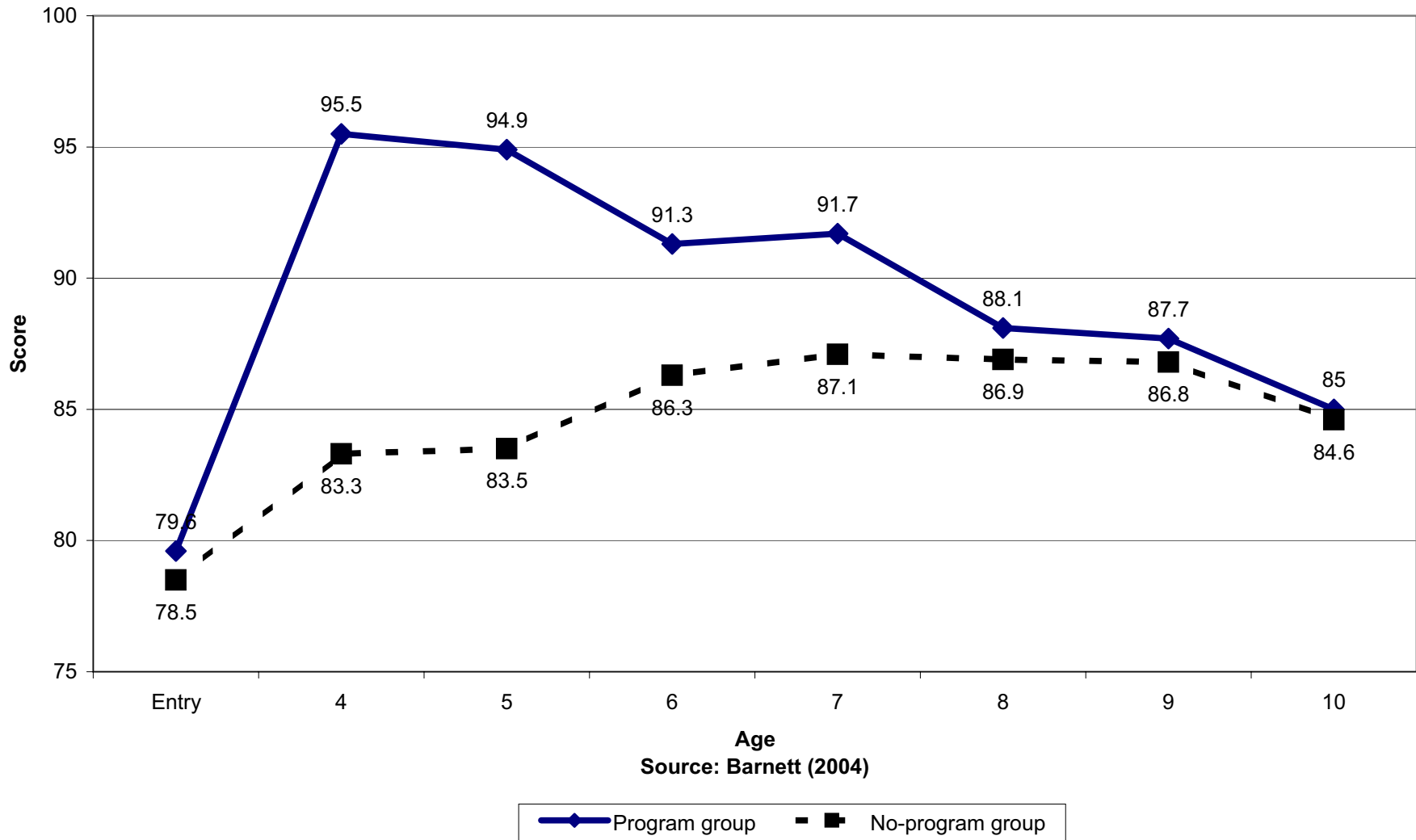


Figure 6B
Perry Preschool: Educational Effects

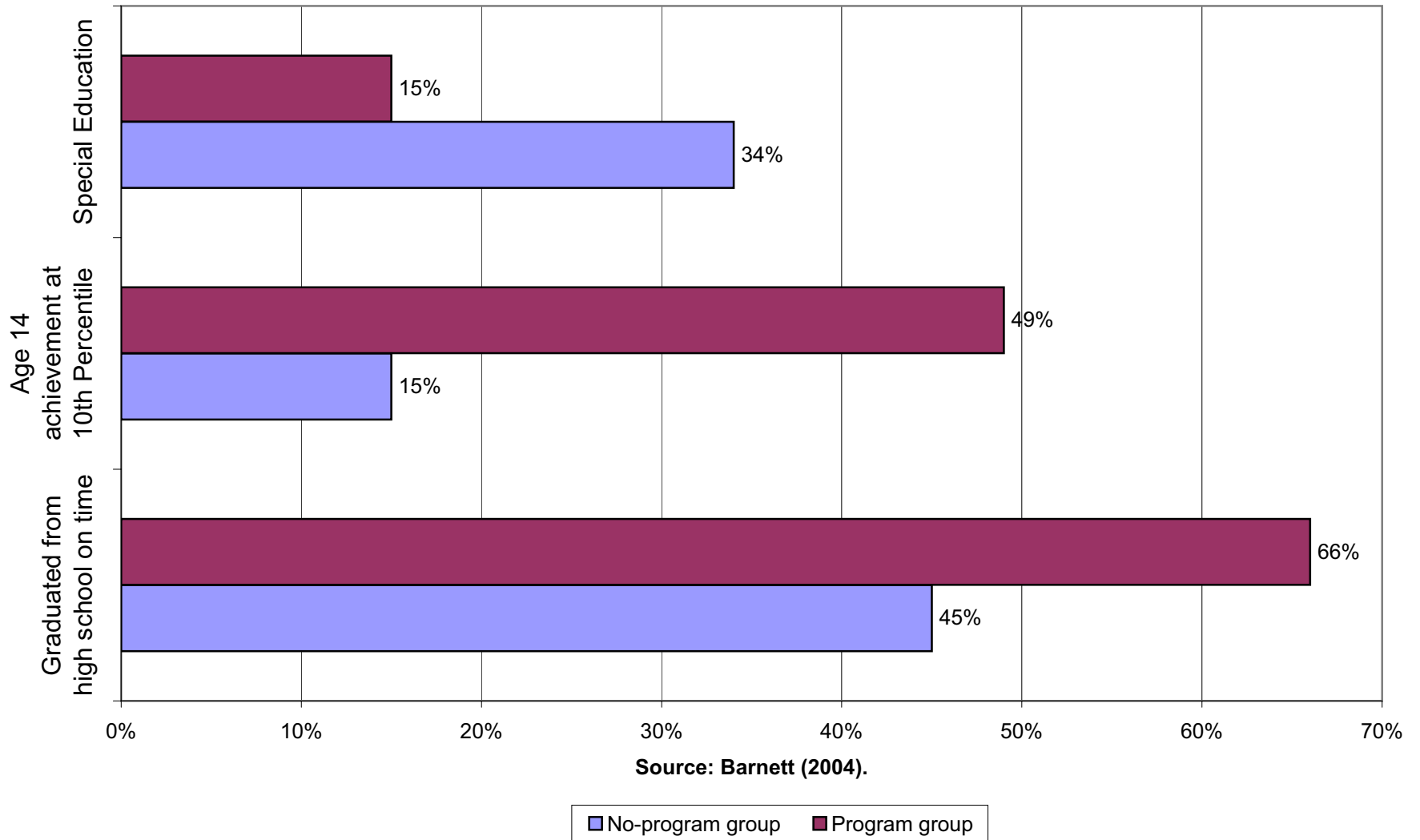


Figure 6C
Perry Preschool: Economic Outcomes

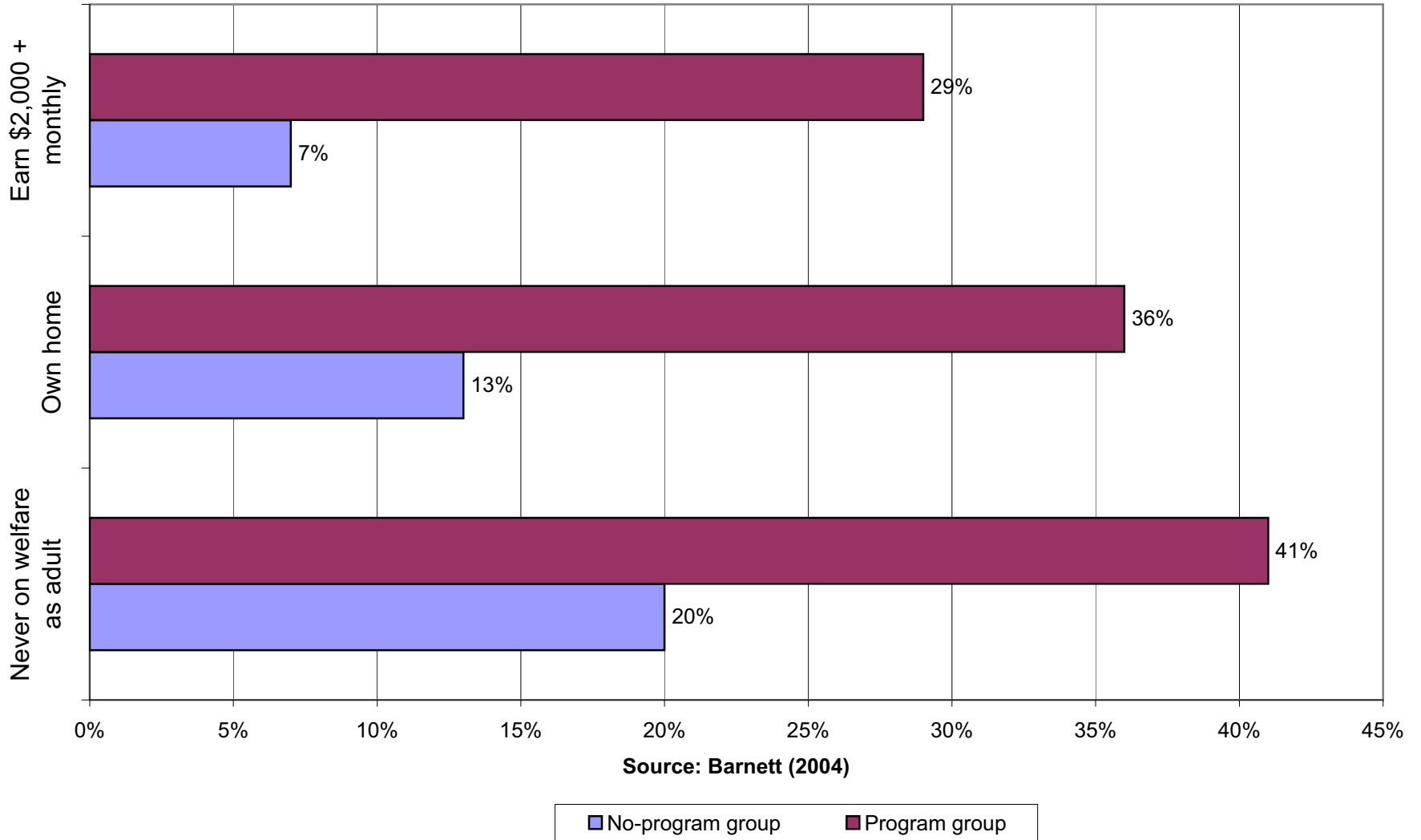


Figure 6D
Perry Preschool: Arrests Per Person by Age 27

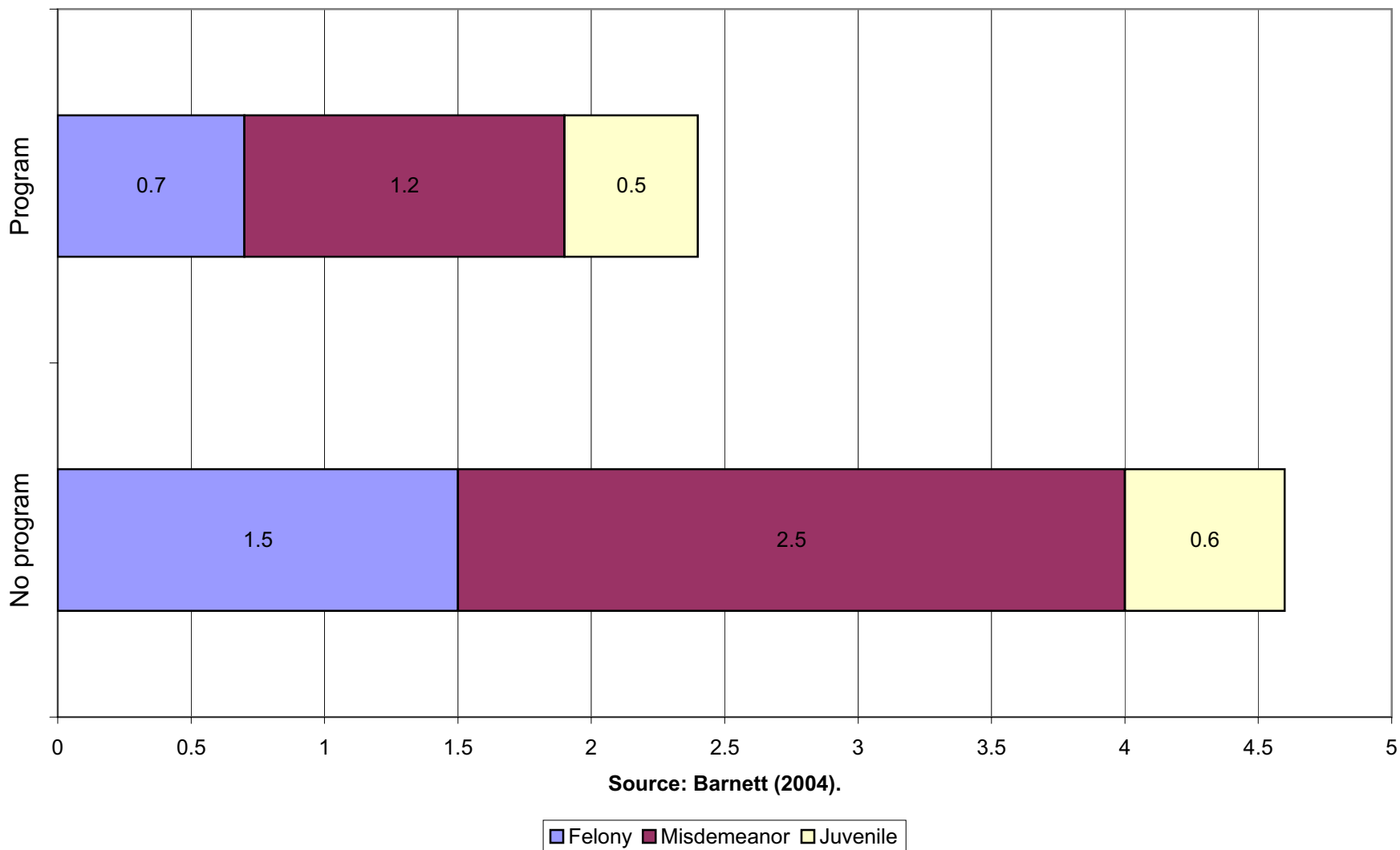


Figure 6E
Other Benefits of Abecedarian

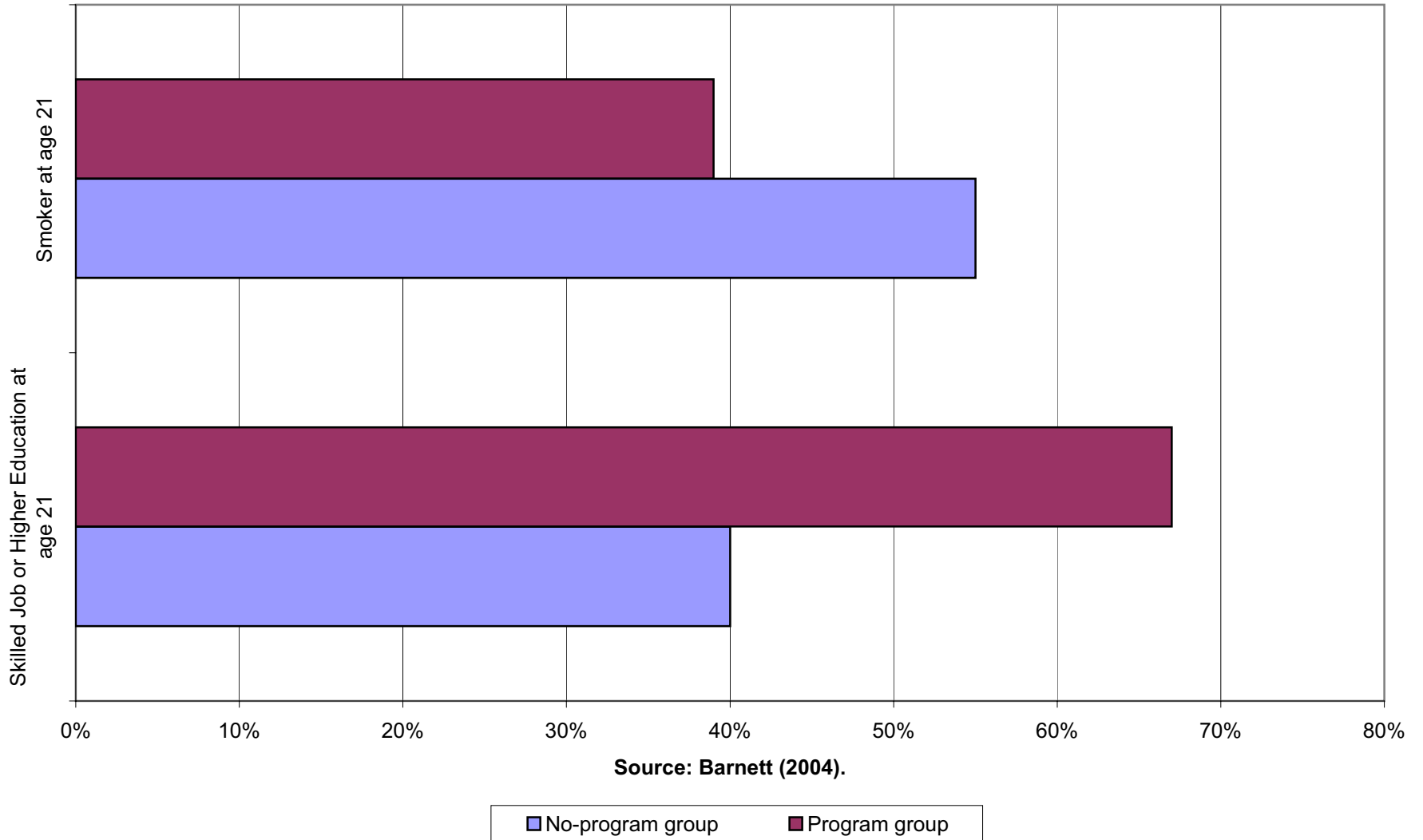
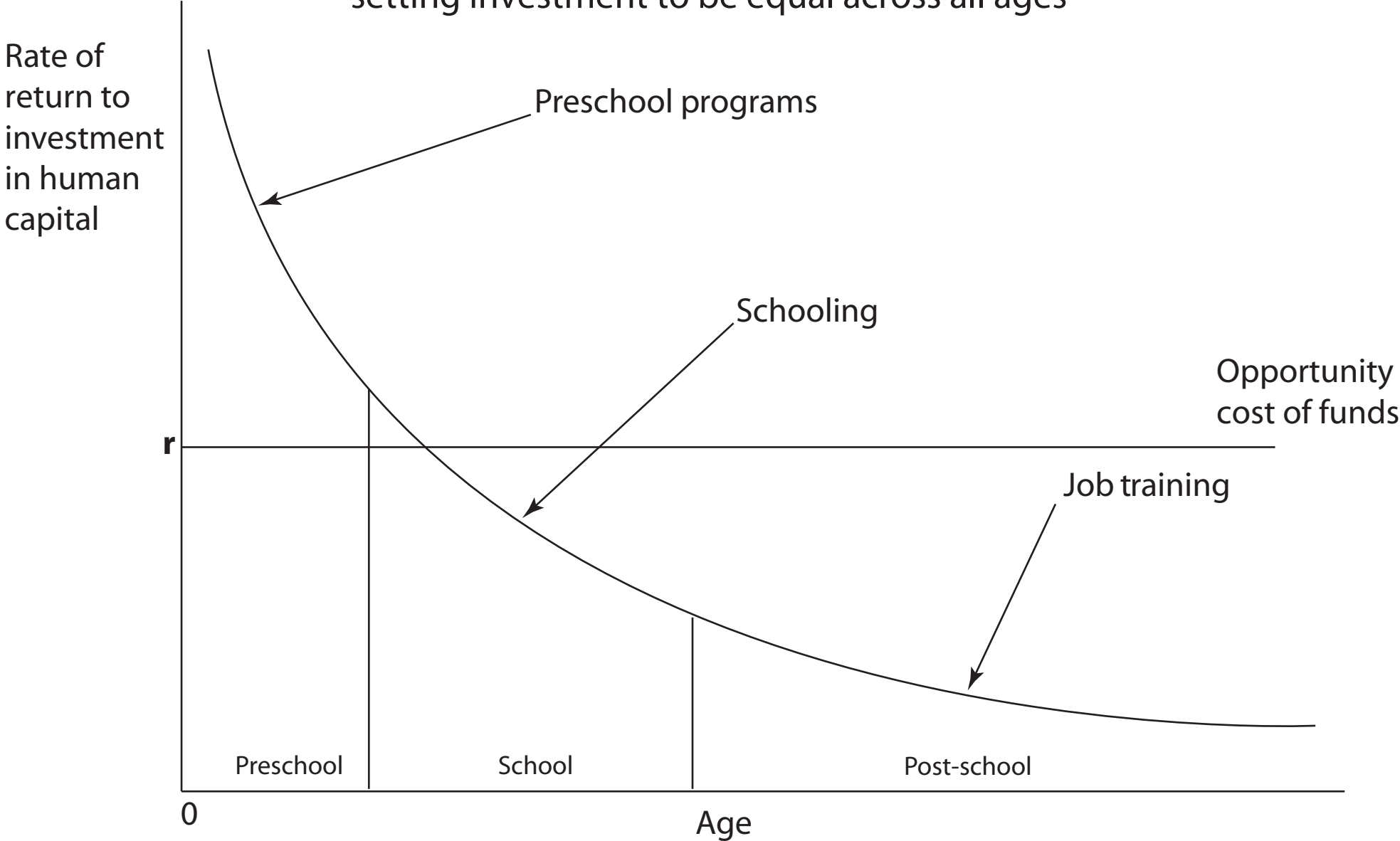


Figure 7
Rates of return to human capital investment initially
setting investment to be equal across all ages



Rates of return to human capital investment initially setting investment to be equal across all ages

Estimated Benefits of Extending Interventions to Poor Children

Table 4. Estimated Net Benefit Of Providing Perry To Poor Children Under 5 in the US Using Data From the Age 40 Follow-Up

Target Group	Net Projected Benefit Per Participant From			Kids Under 5 In Poverty in 2003	Total Net Projected Benefit From Perry (In Billions) For		
	Participant	General Public	Total		Participant	General Public	Total
All Groups							
Boys	-	-	-	2,053,000	118.3	789.9	908.2
Girls	-	-	-	1,969,000	160.6	24.1	184.8
White Alone, Not Hispanic							
Boys	-	-	-	679,000	39.1	261.2	300.4
Girls	-	-	-	609,000	49.7	7.5	57.1
Black Alone							
Boys	57,609	384,747	442,356	603,000	34.7	232.0	266.7
Girls	81,578	12,253	93,831	587,000	47.9	7.2	55.1
Hispanic (Of Any Race)							
Boys	-	-	-	687,000	39.6	264.3	303.9
Girls	-	-	-	678,000	55.3	8.3	63.6

Notes: Since the CPS asks income questions only to people age 15 and over, if a child under age 15 is not part of a family by birth, marriage, or adoption, we do not know their income and cannot determine whether or not they are poor. Net benefits and costs are discounted using a 3% rate, and are projected after age 40. They are taken from Belfield, Nores and Barnett (2004), and are in 2004 dollars. Estimates for black students were used for all other groups.

Additional Reading:

Flavio Cunha, James J. Heckman, Lance Lochner, and Dimitriy V. Masterov. (2005). “Interpreting the Evidence on Life Cycle Skill Formation,” forthcoming in Finis Welch and Eric Hanushek, eds., *The Handbook of Education Economics*, Amsterdam: North Holland.

James Heckman and Dimitriy V. Masterov. (2005). “The Productivity Argument for Investing in Young Children,” Committee For Economic Development, working paper no. 5, available from <http://www.ced.org>.

One-Page Summary:

1. Introduction

Education, perseverance and motivation are all major factors determining productivity, both in the workplace and beyond it. The family is a major producer of these skills, which are indispensable for successful students and workers. Unfortunately, many families have failed to perform this task well in recent years. This retards the growth in the quality of the labor force. Dysfunctional families are also a major determinant of child participation in crime and other costly pathological behaviors. On productivity grounds alone, it appears to make sound business sense to invest in young children from disadvantaged environments. An accumulating body of evidence suggests that early childhood interventions are much more effective than remedies that attempt to compensate for early neglect later in life. Enriched pre-kindergarten programs available to disadvantaged children on a voluntary basis, coupled with home visitation programs, have a strong track record of promoting achievement for disadvantaged children, improving their labor market outcomes and reducing involvement with crime. Such programs are likely to generate substantial savings to society and to promote higher economic growth by improving the skills of the workforce.

2. Human Capital and Economic Performance

Both the quality and quantity of the labor force are not keeping pace with the demands of the skill-based economy. The workforce is aging, and it will not grow in the near future as Baby Boom retirements put great stress on the fiscal system. Labor force quality, as proxied by education, has stagnated and has already reduced American productivity growth. Moreover, the U.S. labor force skills are poor. Over 20% of US workers are functionally illiterate and innumerate. They are a drag on productivity and a source of costly social problems.

3. Crime

Criminal activity is a major burden for America, costing almost \$1.3 trillion per year and \$4,818 per person. Although crime rates have fallen recently, this decline came at a great price. A large fraction of our population is in prison and spending on the justice system is still growing. Enriched early childhood programs appear to reduce future crime, and in the long run they are the least-cost, most effective way to reduce crime—far more effective per dollar than additional expenditures on police or incarceration.

4. The Importance of Cognitive and Noncognitive Abilities in Economic Life

A series of studies conducted by the military has shown that cognitive ability is very important in explaining the differences in job performance, and it has confirmed that it is very difficult to close these gaps with training. However, other types of ability matter. Studies of GED recipients—who have the same cognitive ability as ordinary high school graduates, but perform like dropouts in the labor market—suggest that traits like perseverance and motivation are also important. Heckman, Stixrud and Urzua show that noncognitive ability is key for explaining much of ordinary human behavior like schooling, smoking, crime and early pregnancy.

5. Gaps Open Up Early: Evidence On Enriched Preschool Programs

The best documented study of interventions directed toward children in low-income families with long term follow-up found that participants experienced increased achievement test scores and high school graduation, and decreased grade retention, time in special education, crime and delinquency, though there are important differences by the sex of the child. Extending the program to all of the 4 million children under 5 who are currently living under the poverty line would yield an estimated private net benefit of \$118 billion for boys and \$161 billion for girls. For the general public, the estimated net benefits are \$780 billion and \$24 billion, respectively.

6. The Case for Early Intervention

Early environments play a large role in shaping later outcomes. Skill begets skill and learning begets more learning. Early advantages cumulate; so do early disadvantages. Later remediation of early deficits is costly, and often prohibitively so, though later investments are also necessary since investments across time are complementary. Evidence on the technology of skill formation shows the importance of early investment. At current levels of public support, America under-invests in the early years of its disadvantaged children. Redirecting additional funds toward the early years, before the start of traditional schooling, is a sound investment in the productivity and safety of our society.