

Investing in Disadvantaged Young Children is an Economically Efficient Policy*

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Abstract

This paper presents an efficiency argument for publicly funded investment in disadvantaged young children.

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Why should society invest in disadvantaged young children? The traditional argument for doing so is made on the grounds of fairness and social justice. It is an argument founded on equity considerations.

There is another argument that can be made. It is based on economic efficiency. It is more powerful than the equity argument, in part because the gains from such investment can be quantified and they are large. There are many reasons why investing in disadvantaged young children has a high economic return.

It is a rare public policy initiative that promotes fairness and social justice and at the same time promotes productivity in the economy and in society at large. Investing in disadvantaged young children is such a policy.

Early interventions for disadvantaged children promote schooling, raise the quality of the workforce, enhance the productivity of schools and reduce crime, teenage pregnancy and welfare dependency. They raise earnings and promote social attachment. Focusing solely on earnings gains, returns to dollars invested are as high as 15-17%.

How is it possible to avoid the equity-efficiency tradeoff that plagues so many policies — for example, tax policy or welfare policy? The reason lies in the importance of skills in the modern economy and the dynamic nature of the skill acquisition process. A large body of research in social science, psychology and neuroscience shows that skill begets skill; that learning begets learning. The earlier the seed is planted and watered, the faster and larger it grows. There is substantial evidence of critical or sensitive periods in the lives of young children. Environments that do not stimulate the young and fail to cultivate both cognitive and noncognitive skills place children at an early disadvantage. Once a child falls behind, he or she is likely to remain behind. Remediation for impoverished early environments becomes progressively more costly the later it is attempted in the life cycle of the child. The track record for criminal rehabilitation, adult literacy and late teenage public job training programs is remarkably poor.

Impoverished early environments are powerful predictors of adult failure on a number of social and economic dimensions. Impoverishment is not so much about the lack of money as it is about the lack of cognitive and noncognitive stimulation given to young children. Experimental interventions that enrich early childhood environments produce more successful adults. These interventions raise

both cognitive and noncognitive skills.

1 My Argument in a Nutshell

My argument consists of thirteen points:

- I.** Life cycle skill formation is a dynamic process where early inputs greatly affect the productivity of later inputs in the life cycle of children. Skill begets skill; motivation begets motivation. Early failure begets later failure.
- II.** Many major economic and social problems can be traced to low levels of skill and ability in the population.
- III.** Abilities are multiple in nature.
- IV.** Much public policy discussion focuses on cognitive ability and especially IQ.
- V.** Noncognitive skills are also important for success in life.
- VI.** Motivation, perseverance and tenacity feed into performance in society at large and even affect scores on achievement tests.
- VII.** Early family environments are major predictors of both cognitive and noncognitive ability.
- VIII.** The previous point is a major source of concern because family environments in the U.S. have deteriorated over the past 40 years.
- IX.** Experiments support the nonexperimental evidence that adverse family environments promote adult failure.
- X.** If we intervene early enough, we can affect both cognitive and noncognitive abilities.
- XI.** Early interventions promote schooling, reduce crime, promote workforce productivity and reduce teenage pregnancy.
- XII.** These interventions have high benefit-cost ratios and rates of return.

XIII. Early interventions targeted toward disadvantaged children have much higher returns than later interventions such as reduced pupil-teacher ratios, public job training, convict rehabilitation programs, tuition subsidies or expenditure on police.

2 Some Problems Facing American Society and Their Roots in Early Disadvantage

Consider some major problems facing American society. First, there is a slowdown in the growth of labor force quality. See Table 1 which documents that the U.S. workforce will add many fewer college graduates to its workforce in the next 20 years than it did in the last 20 years. The percentage of each cohort of Americans who attend college has stalled out in recent decades after a spectacular early growth in the first half of the twentieth century (see Figure 1). Properly counted, the high school dropout rate is increasing at a time when return to schooling has increased (see Figure 2). This increase in the dropout rate is occurring among native populations, and is not solely due to immigrants.

Over 20% of the U.S. workforce is functionally illiterate, compared to about 10% in Germany and Sweden. Functionally illiterate adults do not understand the instructions on medical prescriptions. 20% of all American adults say the sun goes around the earth.

Crime is another social problem. Anderson (1999) finds that the net cost of crime in American society is \$1.3 trillion per year, with a per capita cost of \$4,818 per year. Violent and property levels remain high, despite large declines in recent years. Crime reduction is extremely expensive, and spending on the criminal justice system is still increasing.

3 Ability and Outcomes

Much public policy discussion is focused on cognitive test score measurements, even though cognitive test scores miss important aspects of human development. Cognitive and noncognitive ability are both important in explaining schooling, crime and a variety of other outcomes. Noncognitive ability is neglected in many public policy discussions regarding early childhood. Yet noncognitive ability is

a major determinant of socioeconomic success as the Figures 3a-3f reveal. They show how outcomes are affected as we move people from the bottom to the top of the distribution of both cognitive and noncognitive skills. These figures show how performance on many socioeconomic dimensions is critically affected by both cognitive and noncognitive skills. Both are equally important.

4 Gaps in Ability Open Up Early

Going across income groups, gaps in cognitive ability emerge early in the life cycle, and widen slightly in the early years of schooling. They stay constant after age 8. Research shows that schooling environments play only a small role in accounting for these gaps or in widening or narrowing them. They start early and persist. Once we control for early family environments, the gaps narrow. See Figures 4a and 4b.

Similar phenomena characterize noncognitive skills. Gaps by family income appear early and persist. Schooling quality plays little role in accounting for gaps or their stability. Controlling for early family environments largely eliminates these gaps. See Figures 4c and 4d.

5 Early Family Environments

Early family environments are major predictors of abilities (both cognitive and noncognitive). This is a source of concern because they have deteriorated over the past 30 years. Relatively more U.S. children are born into disadvantaged environments compared to 40 years ago (see Figure 5). Experiments indicate that the empirical relationships shown in Figures 4b and 4d are causal. Improvements in family environments affect both cognitive and noncognitive skills.

A great deal of American public policy discussion is focused on cognitive test score measurements. Head Start was deemed a failure because it did not raise IQ. But such a judgement is premature. Consider the Perry Preschool Program. This was an experimental intervention in the lives of disadvantaged minority children. Figure 6a shows that the Perry intervention group had no higher test scores than the control group. Yet, in a follow up to age 40, the Perry treatment children had higher achievement test scores than did the control children. On many dimensions, the Perry

treatment children are far more successful than the controls (see Figures 6b-6d). Early interventions can partially compensate for early disadvantage.

Perry intervened relatively late (at ages 4-6) in the life of the developing child. Earlier interventions like the ABCDerian program that starts when subjects are 4 months of age permanently raises the IQ and the noncognitive skills of the treatment group over the control group.

The economic benefits of the Perry Program are substantial. Rates of return are 15-17%. (See Rolnick and Grunewald, 2003) The benefit-cost ratio is eight to one. Similar returns are obtained for other early intervention programs.

6 Can We Look to the Schools to Remedy Early Disadvantage?

A major finding from the research literature is that schools and school quality contribute little to the emergence of test score gaps among children. The Coleman (1966) report showed that families and not schools were the major sources of inequality in student performance. By the second grade, gaps in test scores across socioeconomic groups are stable by age, suggesting that later schooling has little effect in reducing or widening the gaps that appear before students enter school.

Carneiro and Heckman (2003) perform a cost-benefit analysis of classroom size reduction on adult earnings. While smaller classes raise the adult earnings of students, the earnings gains do not offset the costs of hiring additional teachers.

Because of the dynamics of human skill formation, the abilities and motivations that children bring to school play a far greater role in promoting performance in school than do the traditional inputs that receive so much attention in public policy debates.

7 Tuition Policy

Evidence by Carneiro and Heckman (2002, 2003) suggests that resources available to children in their college going years play only a small role in accounting for socioeconomic and ethnic differentials in attending college. At most 8% of the families in America cannot afford to send their children

to school. While policies targeted to this 8% are cost effective, the major source of the gaps in college attendance is gaps in the abilities that children have in their late teens. These ability gaps are formed much earlier in life.

8 Remediation

America is a second chance society. We believe in the possibility of redemption and renewal. Our bankruptcy laws, and our educational policy reflect a fundamental optimism about the possibility of human change. However, the track record of criminal rehabilitation programs, adult literacy programs and public job training programs is poor. A few selectively targeted versions of these programs may yield modest benefits.

The dynamics of human skill formation as analyzed in Cunha and Heckman (2003) and Cunha, Heckman, Lochner, and Masterov (2006) reveal that later compensation for deficient early family environments is very costly. Lack of early skill and motivation begets lack of future skill and motivation. If we wait too long to compensate, it is economically inefficient to invest in the skills of the disadvantaged. A serious tradeoff exists between equity and efficiency for adolescent and young adult skill policies. There is no such tradeoff for policies targeted toward disadvantaged young children.

Figure 7 captures the findings of a large literature. The economic return to early interventions is high. The return to later intervention is lower. The reason for this relationship is the technology of skill formation. Skill begets skill and early skill makes later skill acquisition easier. Remedial programs in the adolescent and young adult years are much more costly in producing the same level of skill attainment in adulthood. Most are economically inefficient.

Children from advantaged environments by and large receive substantial early investment. Children from disadvantaged environments more often do not. There is a strong case for public support for funding interventions in early childhood for disadvantaged children although the interventions do not have to be conducted in public centers. Vouchers for use in privately run programs might allay the concerns of many parents who want to determine the values held by their children and yet who want to enrich their children's early cognitive and noncognitive stimulation.

9 Summary

Summarizing my argument,

- I.** Life cycle skill formation is a dynamic process where early inputs greatly affect the productivity of later inputs in the lifecycle of children. Skill begets skill; motivation begets motivation. Early failure begets later failure.
- II.** Many major economic and social problems can be traced to low levels of skill and ability in the population.
- III.** Abilities are multiple in nature.
- IV.** Much public policy discussion focuses on cognitive ability and especially IQ.
- V.** Noncognitive abilities are also important for success in life..
- VI.** They feed in to performance on achievement tests and in society at large.
- VII.** Early family environments are major predictors of both types of ability.
- VIII.** Point VII is a source of concern because family environments have deteriorated in America over the past 40 years, and a greater proportion of the future American workforce will come from disadvantaged environments.
- IX.** Experiments support the nonexperimental evidence that early family environments affect adult outcomes. Early compensation for disadvantage can partially offset the disadvantage.
- X.** If we intervene early enough we can affect both cognitive and noncognitive abilities.
- XI.** Early interventions promote schooling, reduce crime, promote productivity in the workplace and reduce teenage pregnancy.
- XII.** Early interventions have high benefit-cost ratios and rates of return.
- XIII.** Early interventions have much higher returns targeted toward disadvantaged children than do other later interventions (pupil teacher ratios; public job training; convict rehabilitation programs; direct expenditure on police; adult literacy).

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Table 1
Educational Characteristics of the Labor Force^(a)

Labor Force, Age 25 and Over					
Education	1980	(change)	2000	(change)	2020 ^(b)
Less than HS	17.3	-5.3	12.0	0.9	12.9
HS Only	31.5	6.3	37.8	3.8	41.6
Some post-HS	13.5	19.4	32.9	6.2	39.1
At Least College Degree	17.3	18.5	35.8	7.7	43.5
<i>% College Graduates</i>	<i>21.7%</i>	<i>47.8%</i>	<i>30.2%</i>	<i>41.4%</i>	<i>31.7%</i>
Total	79.8	38.7	118.5	18.6	137.1

Source: Ellwood (2001). (a) All figures in millions of workers; (b) Projected.

Figure 1

Schooling Participation Rates by Year of Birth: Data from CPS 2000

A. Whites

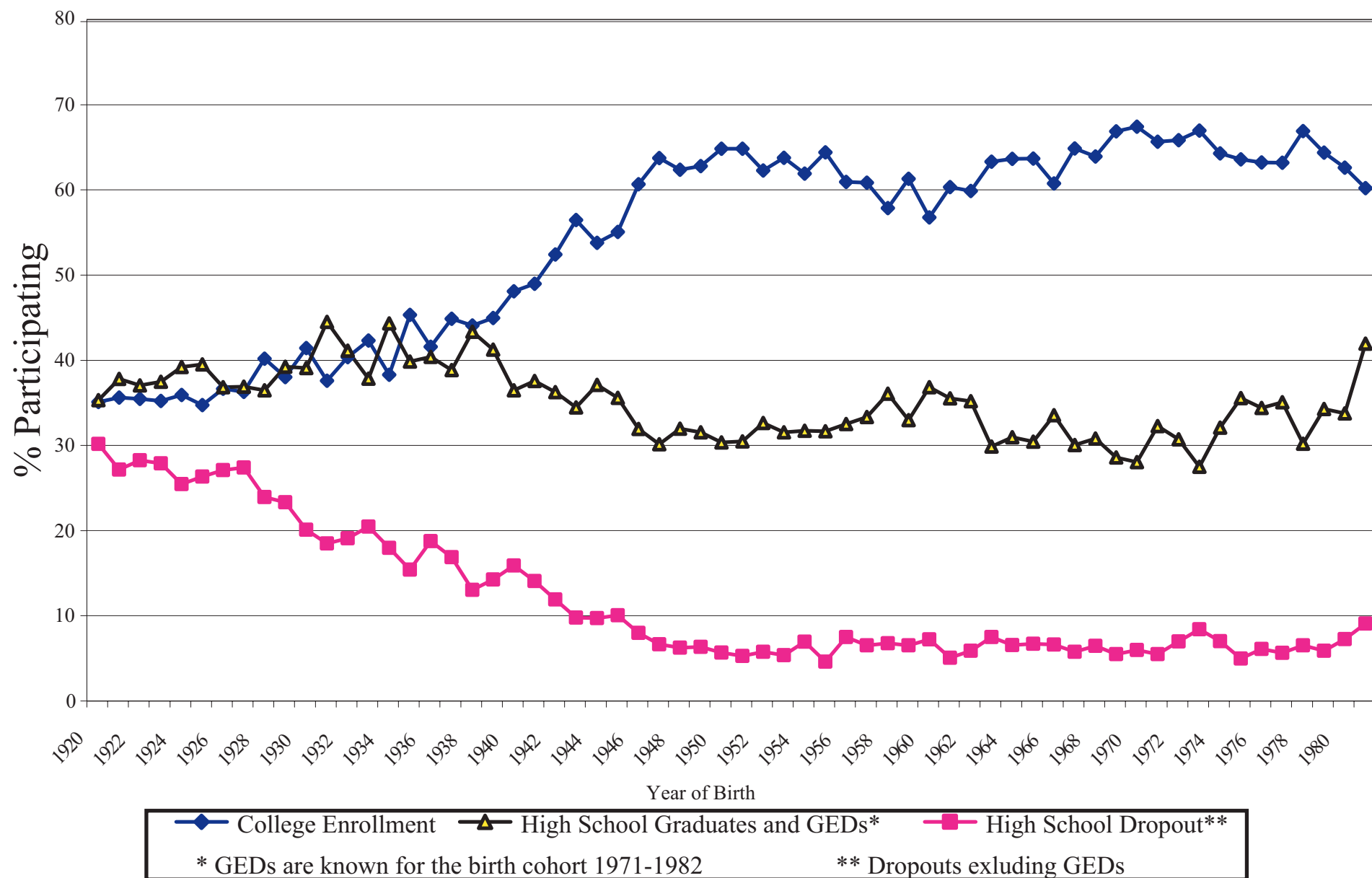


Figure 2

Educational Statistics by Category Over Time

A. Share of High School Dropouts in the United States, 1971-1999

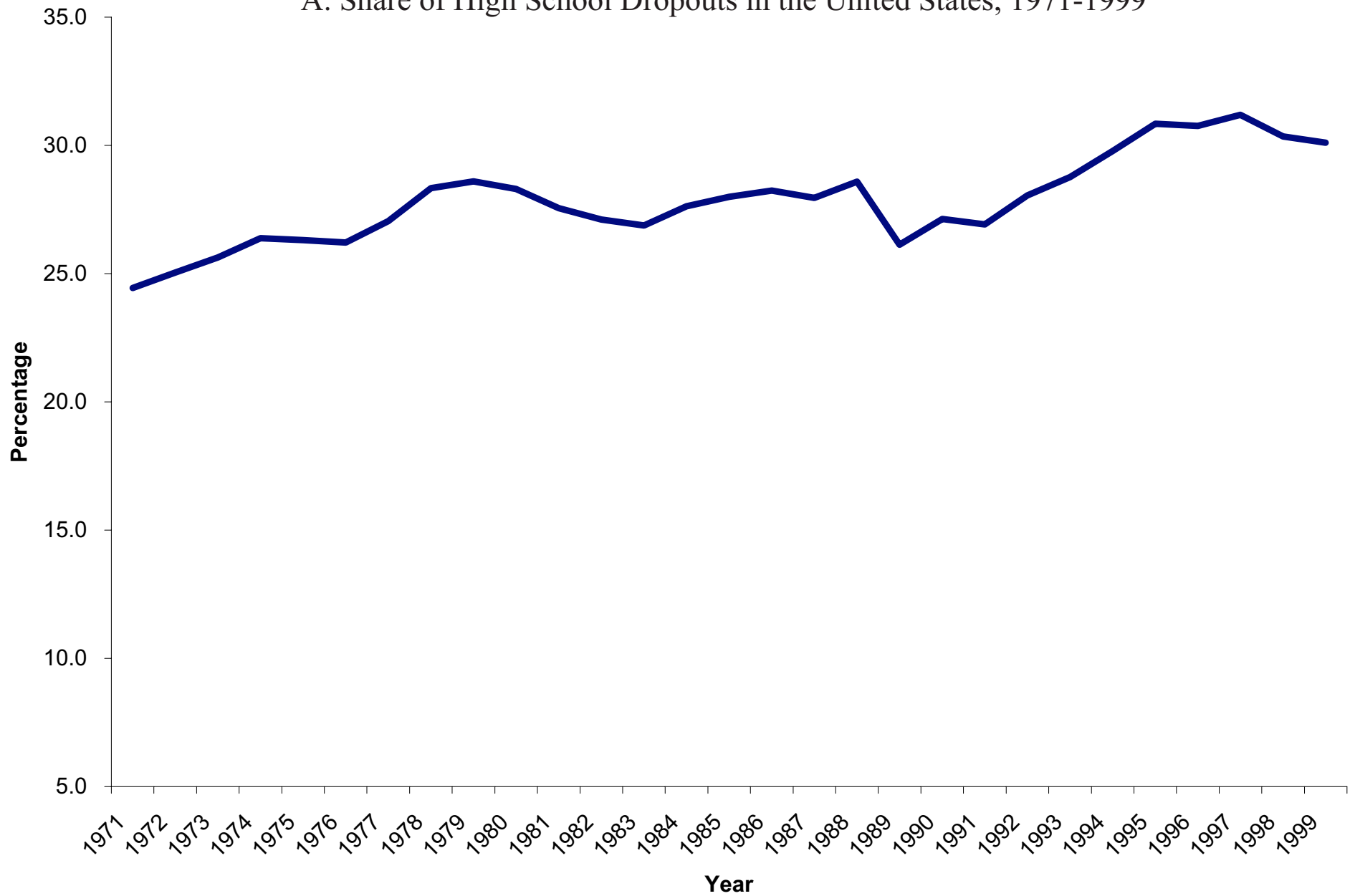
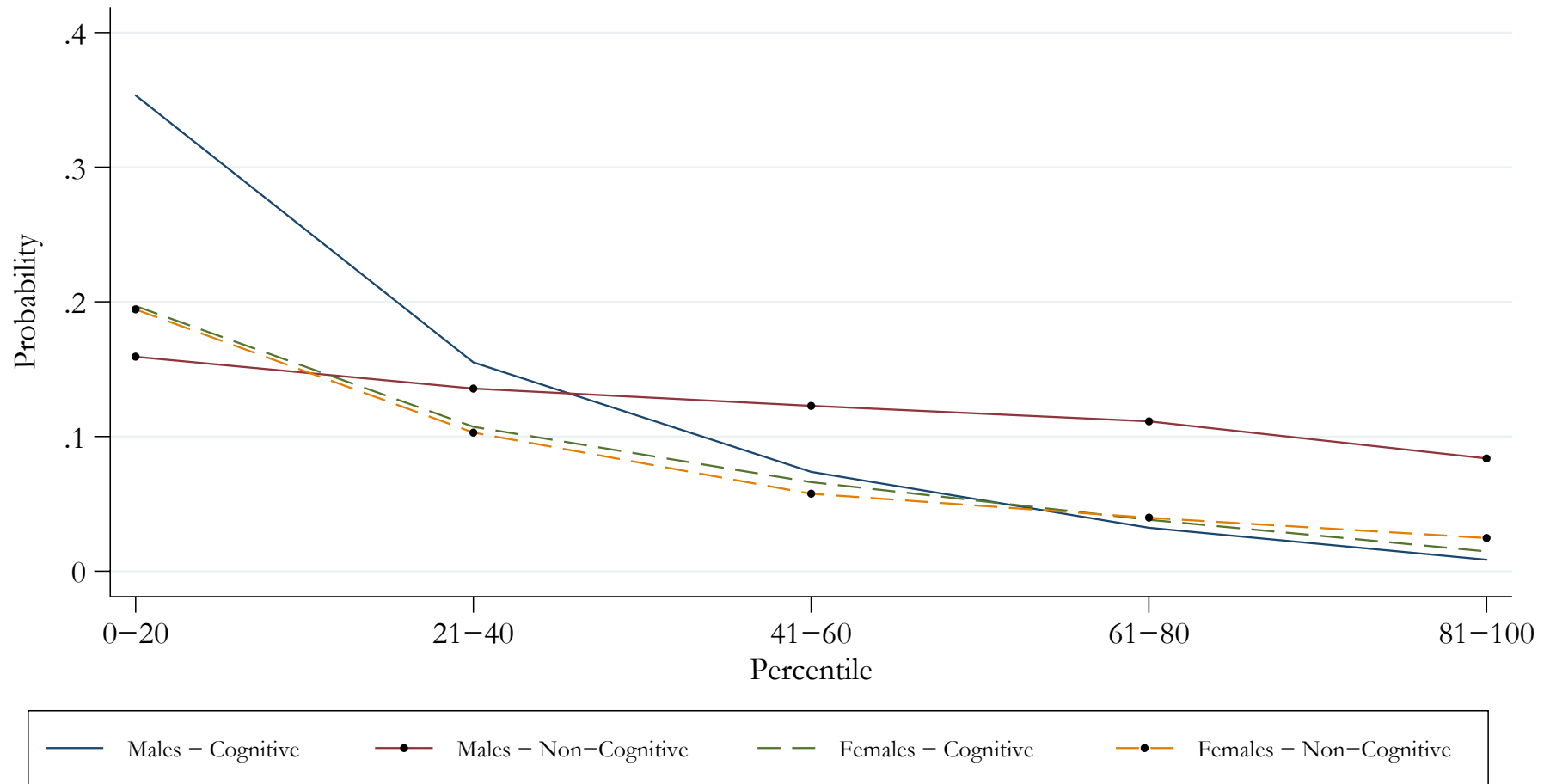


Figure 3a

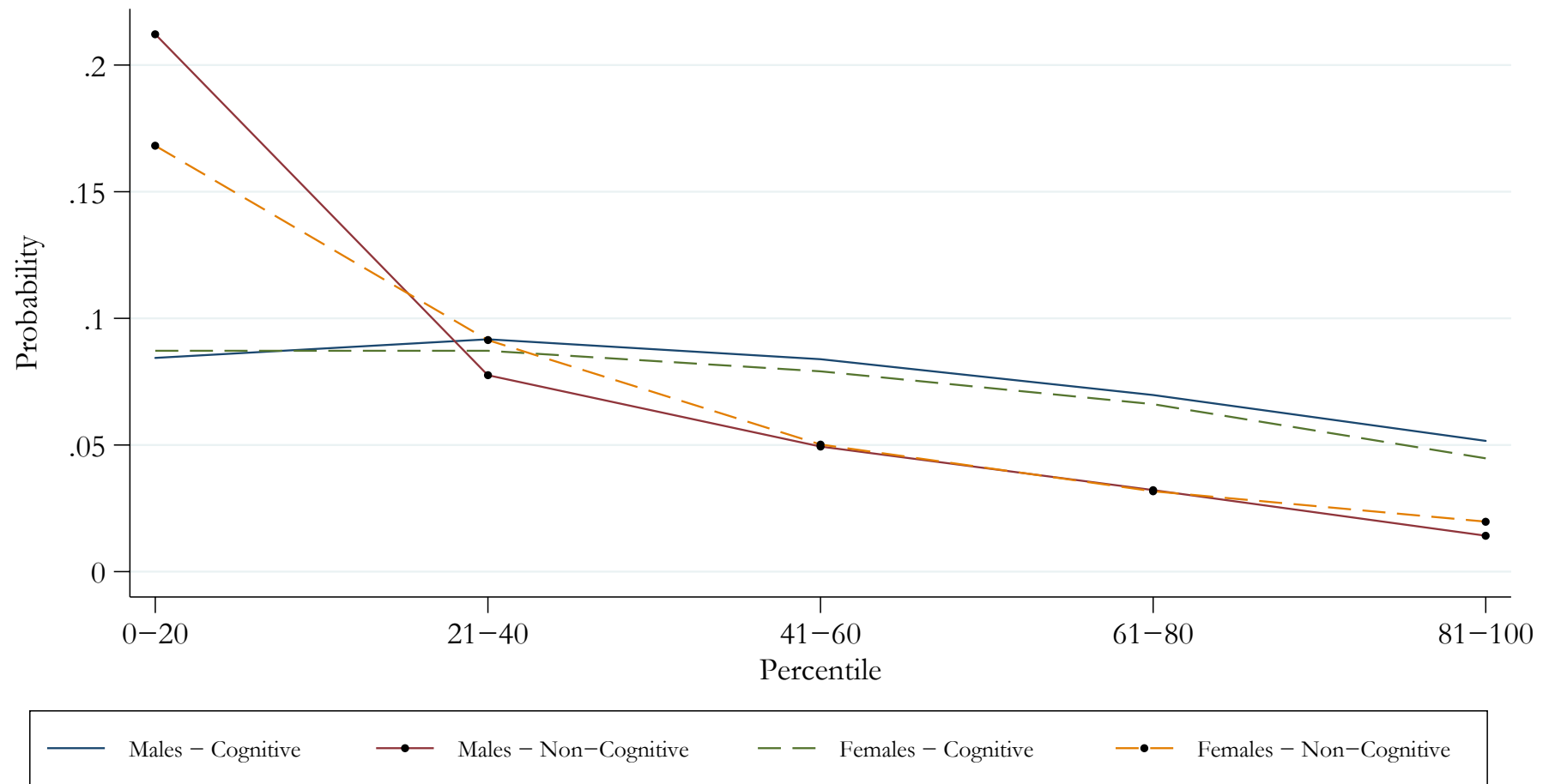
Probability of Being a High School Dropout (no GED), by Ability



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).

Figure 3b

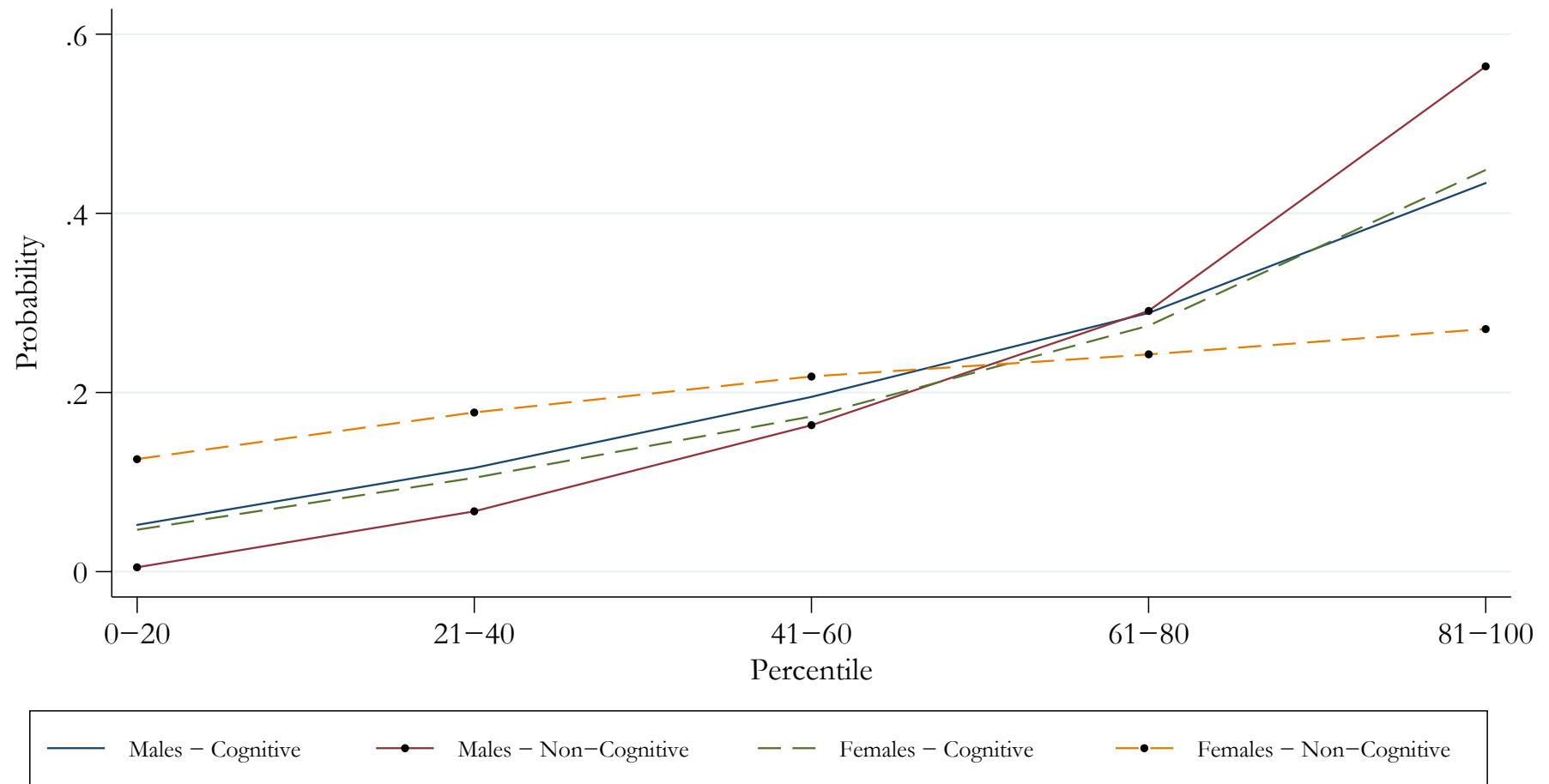
Probability of Highest Attainment = GED, by Ability



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).

Figure 3c

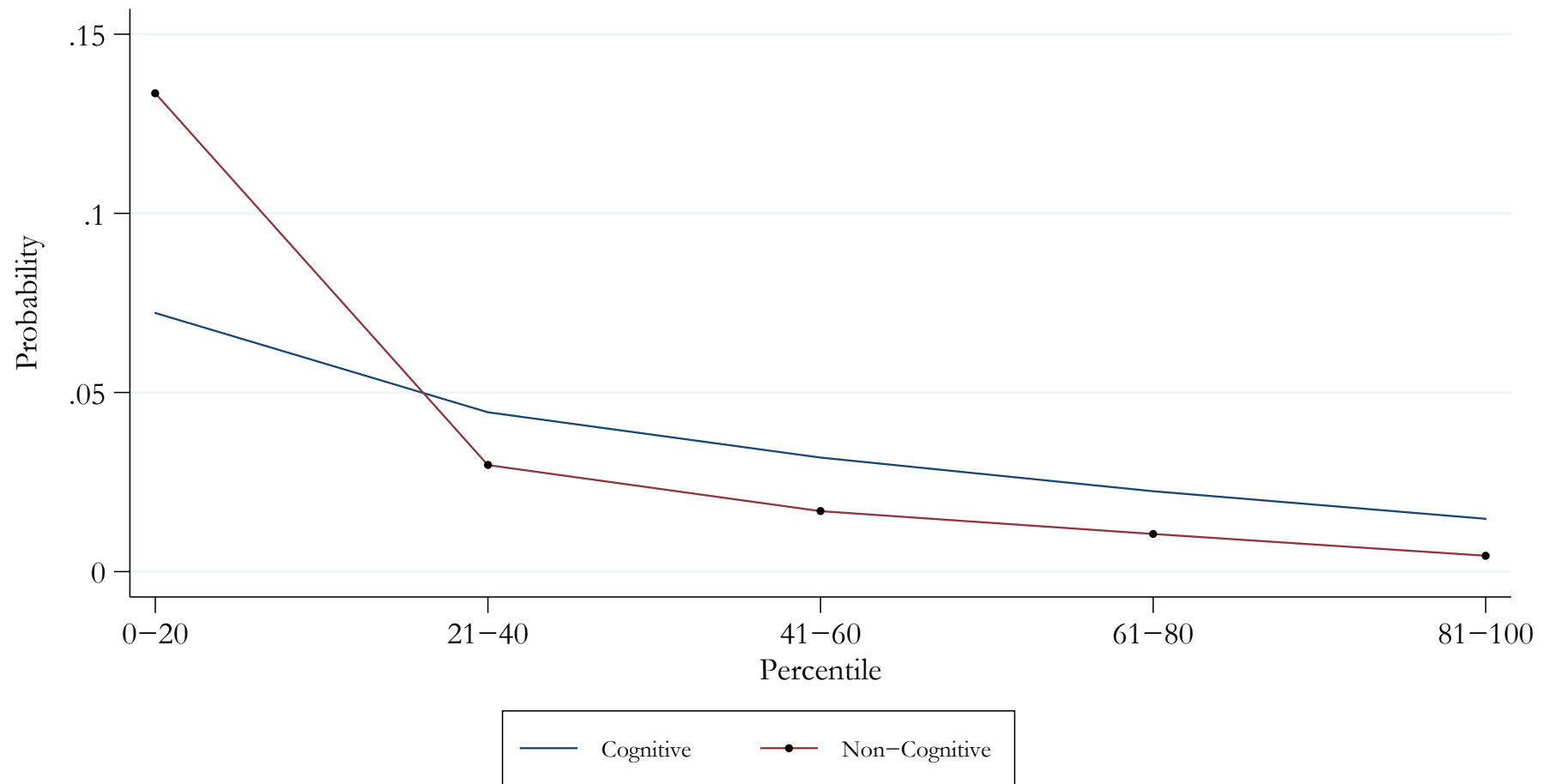
Probability of Being a 4-yr College Graduate, by Ability



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).

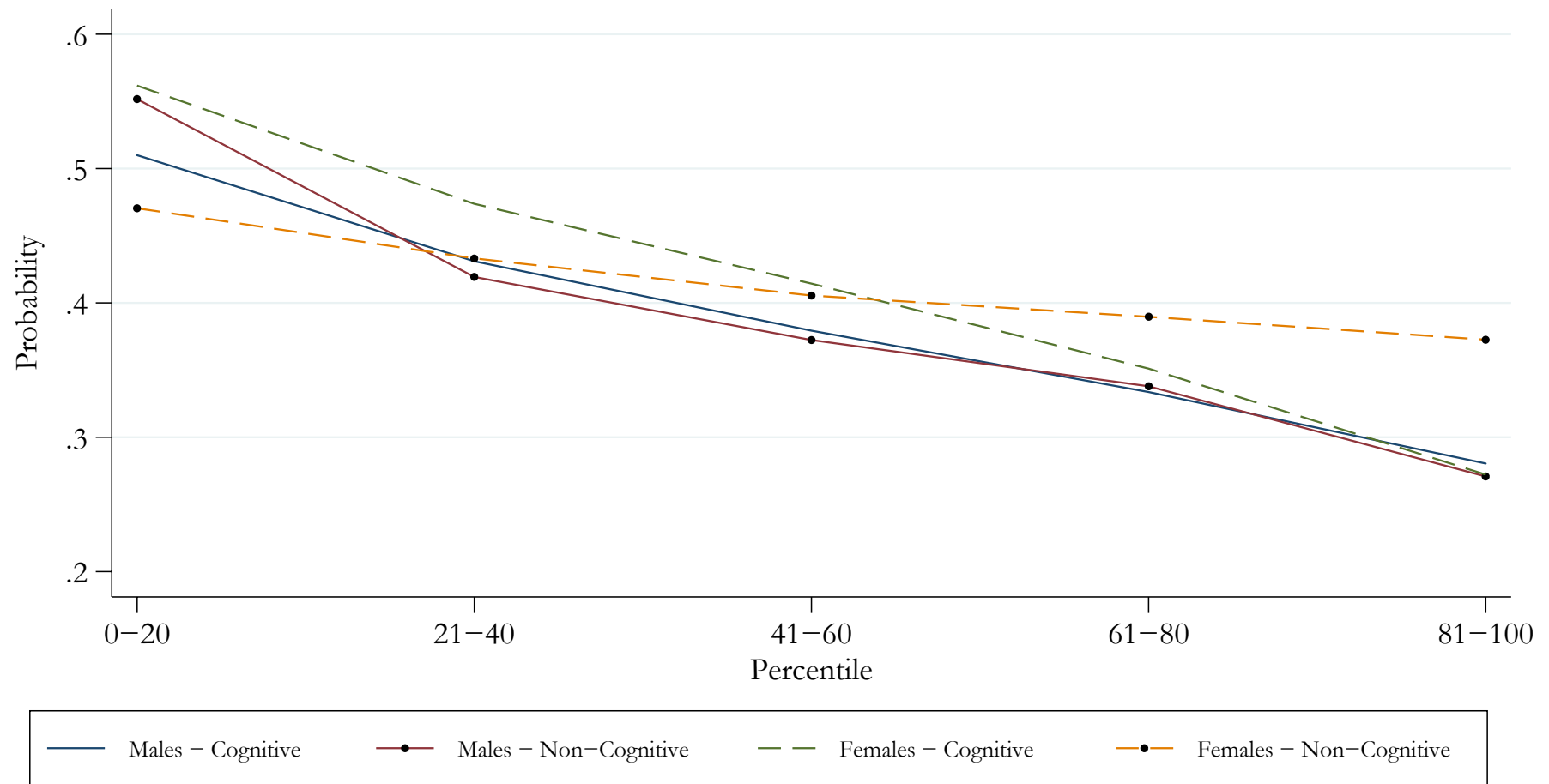
Figure 3d

Ever 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).

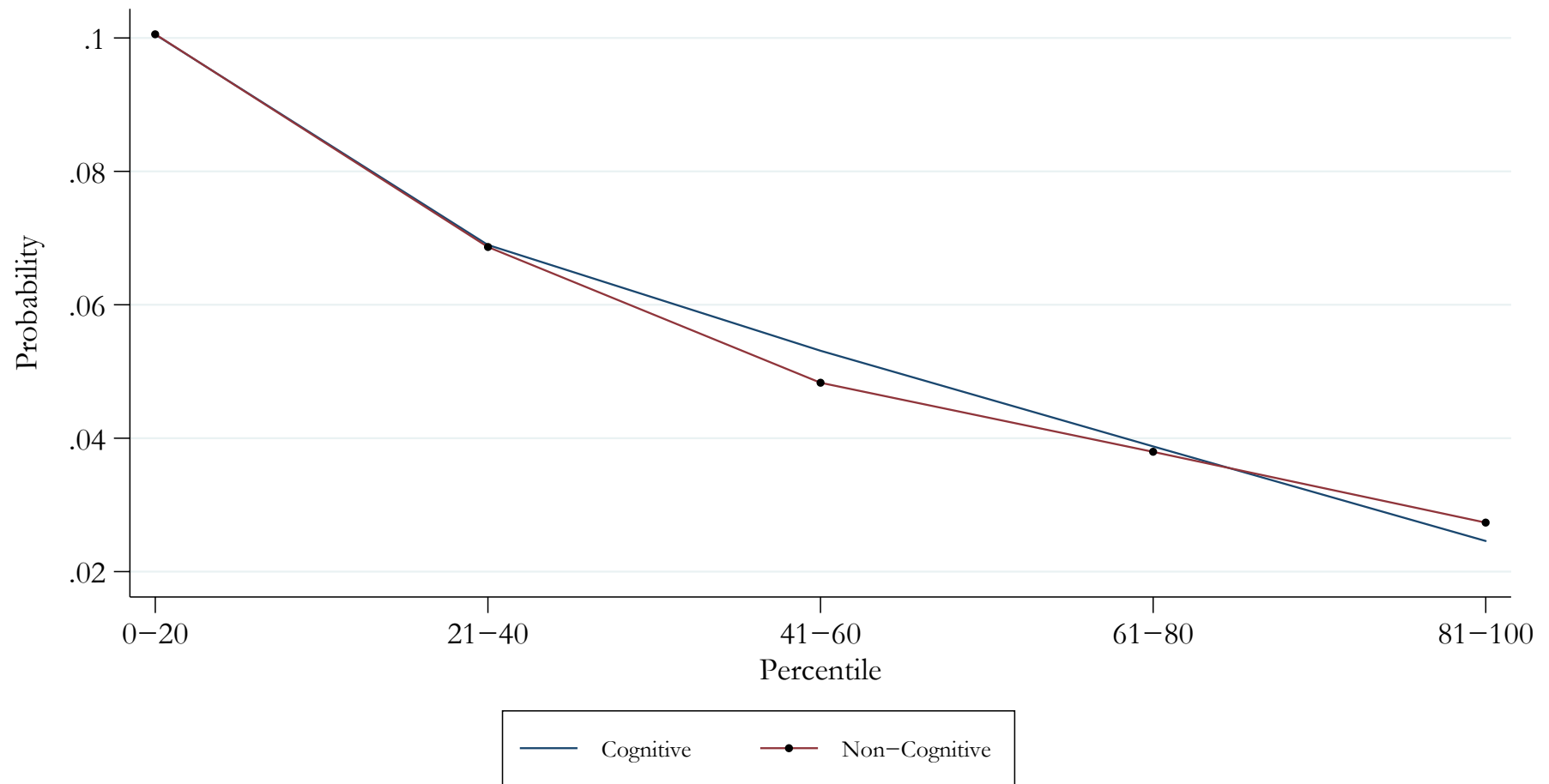
Figure 3e
Daily Smoker at Age 18, by Ability



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).

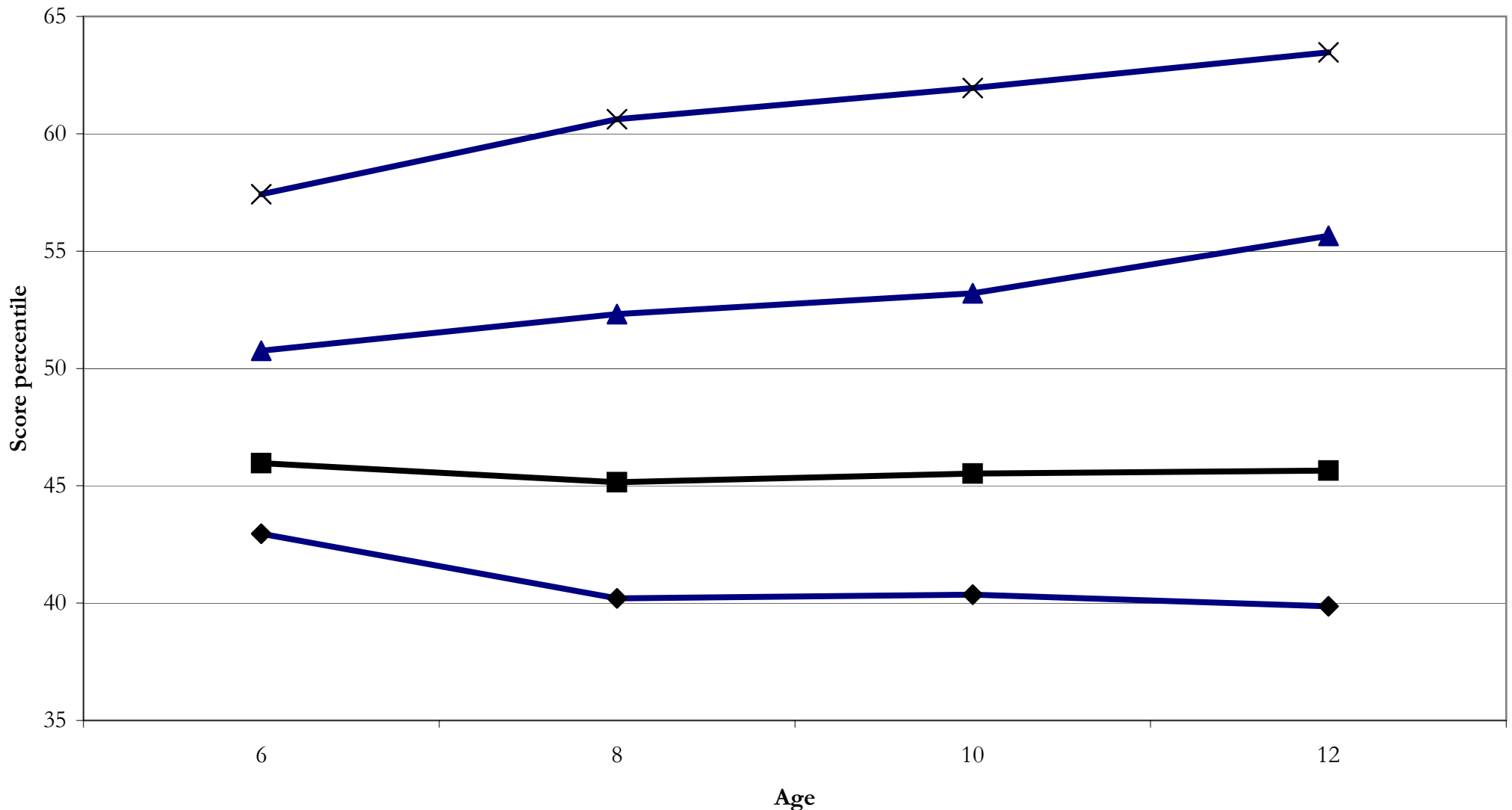
Figure 3f

Probabilty 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).

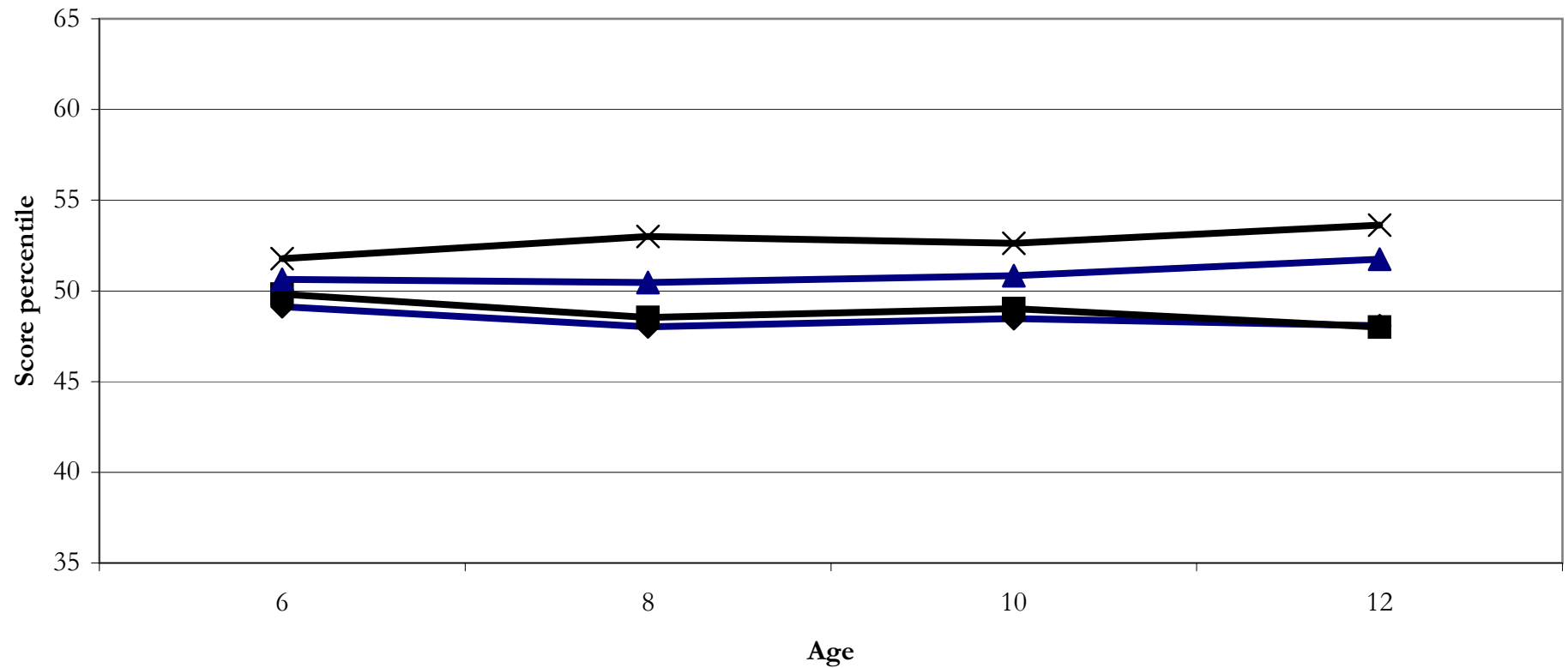
Figure 4a
Children of NLSY
Average percentile rank on PIAT-Math score, by income quartile*



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

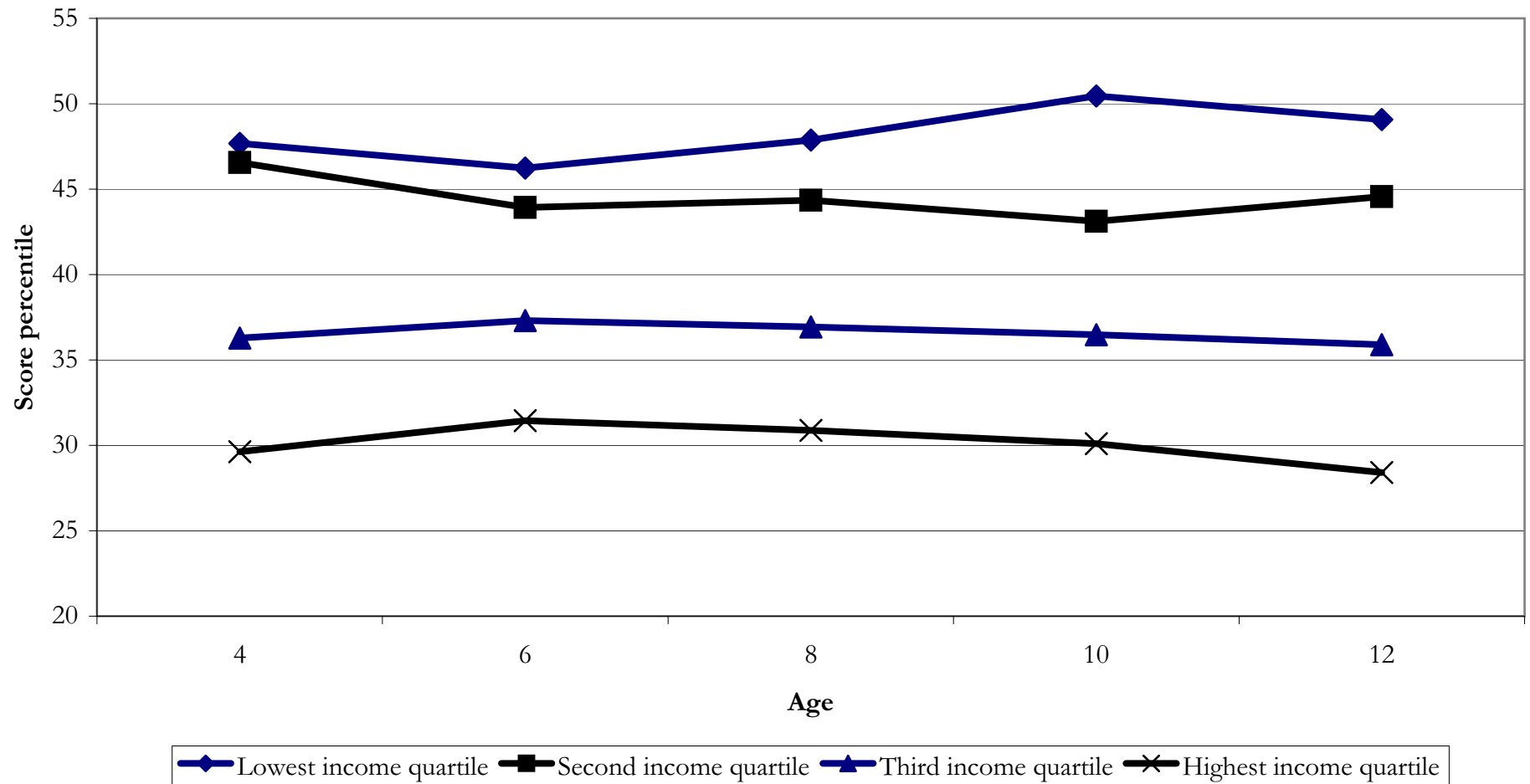
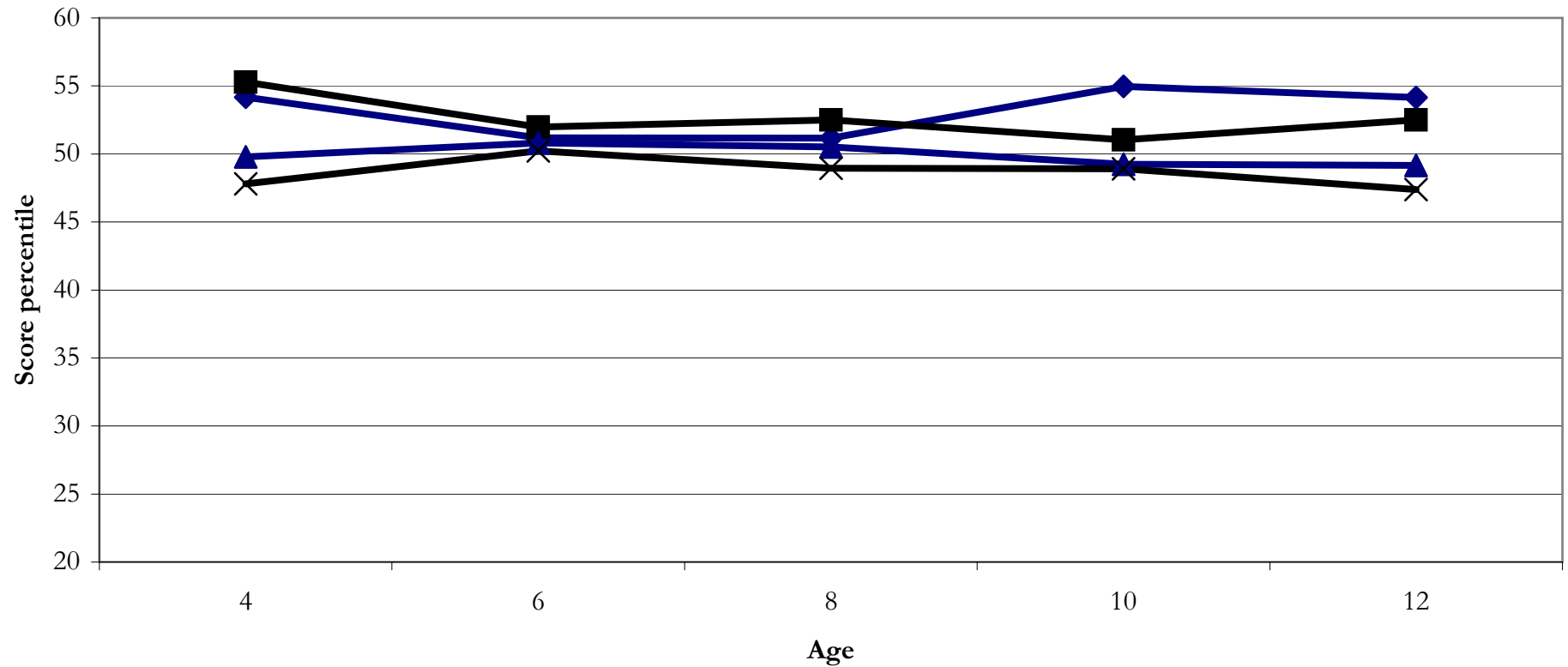


Figure 4d Children of NLSY

Adjusted average anti-social score percentile by income quartile*

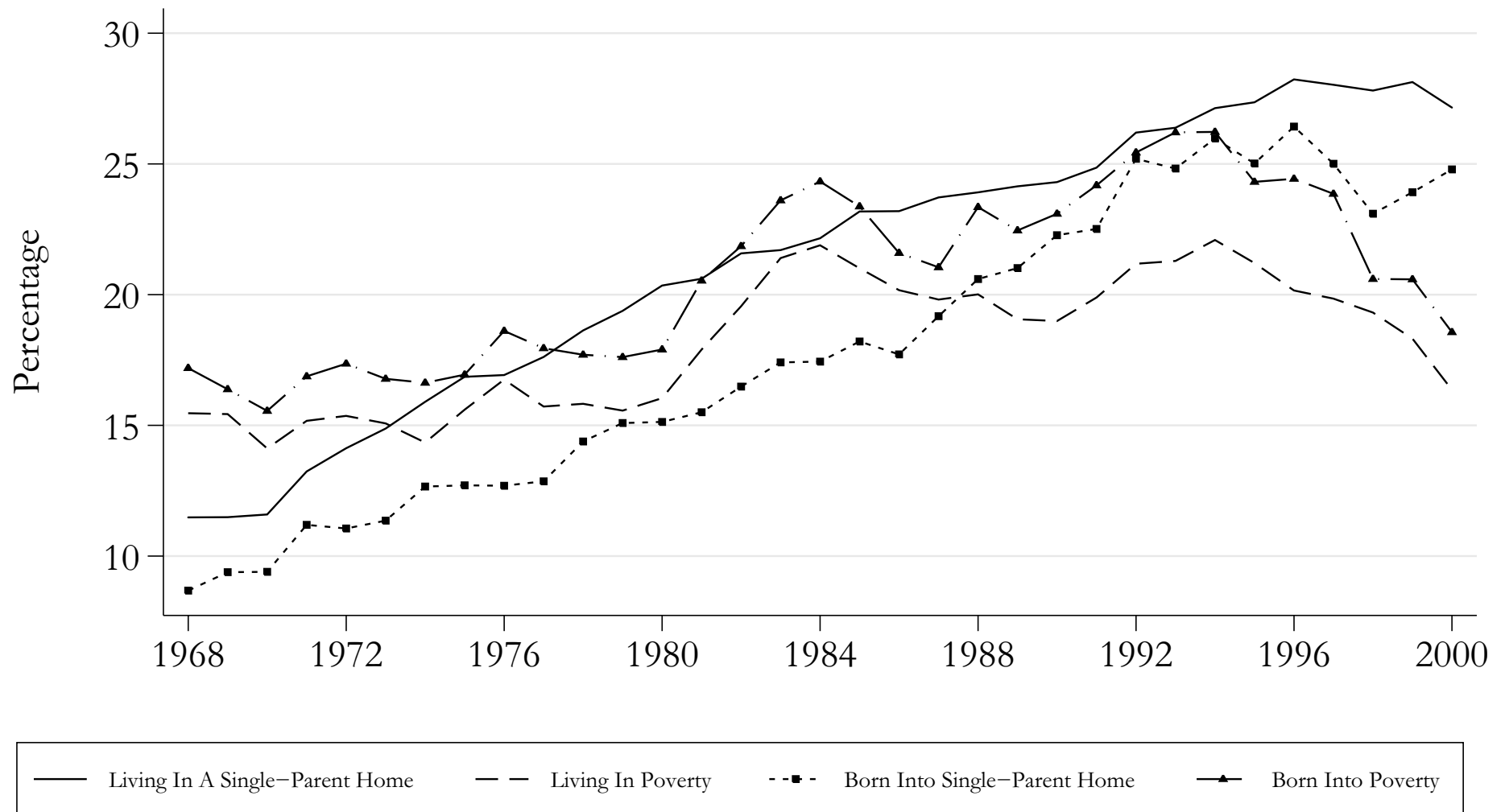


* Adjusted by maternal education, maternal AFQT (corrected for the effect of schooling) and broken home at each age

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

Figure 5

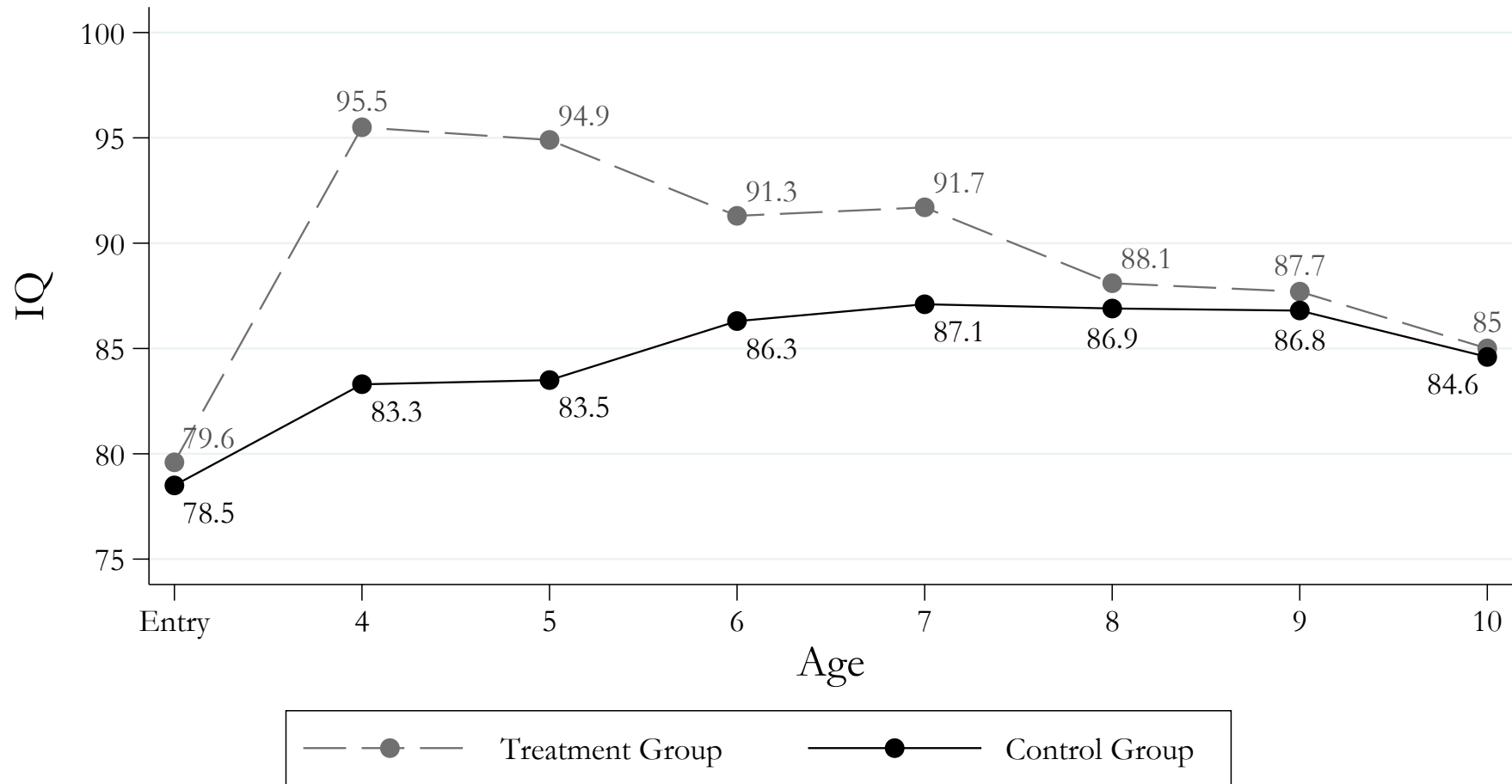
Percentage Of All Children Born Or Living In Adverse Environments In Each Year, 1968–2000



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.

Figure 6a

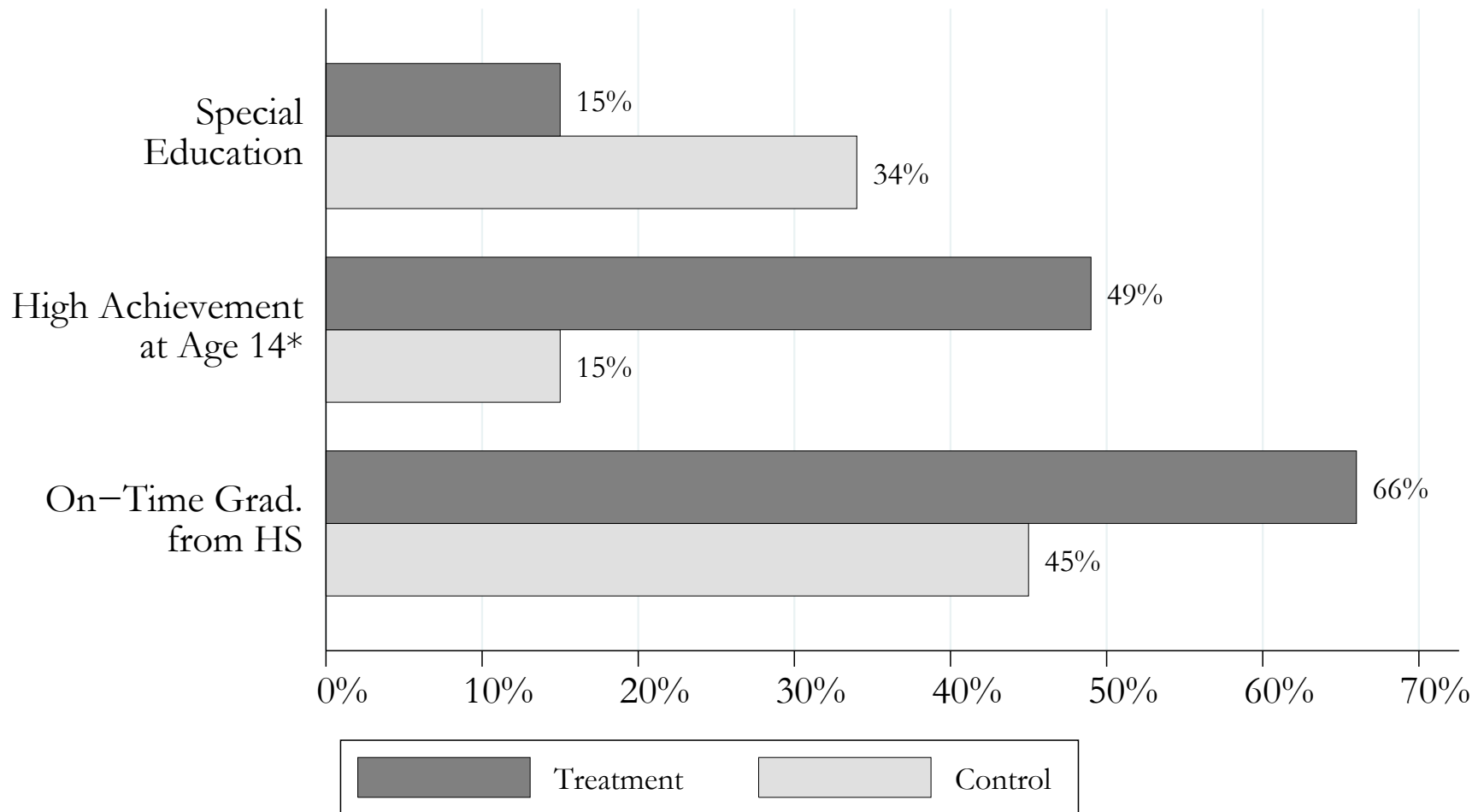
Perry Preschool Program: IQ, by Age and Treatment Group



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.

Figure 6b

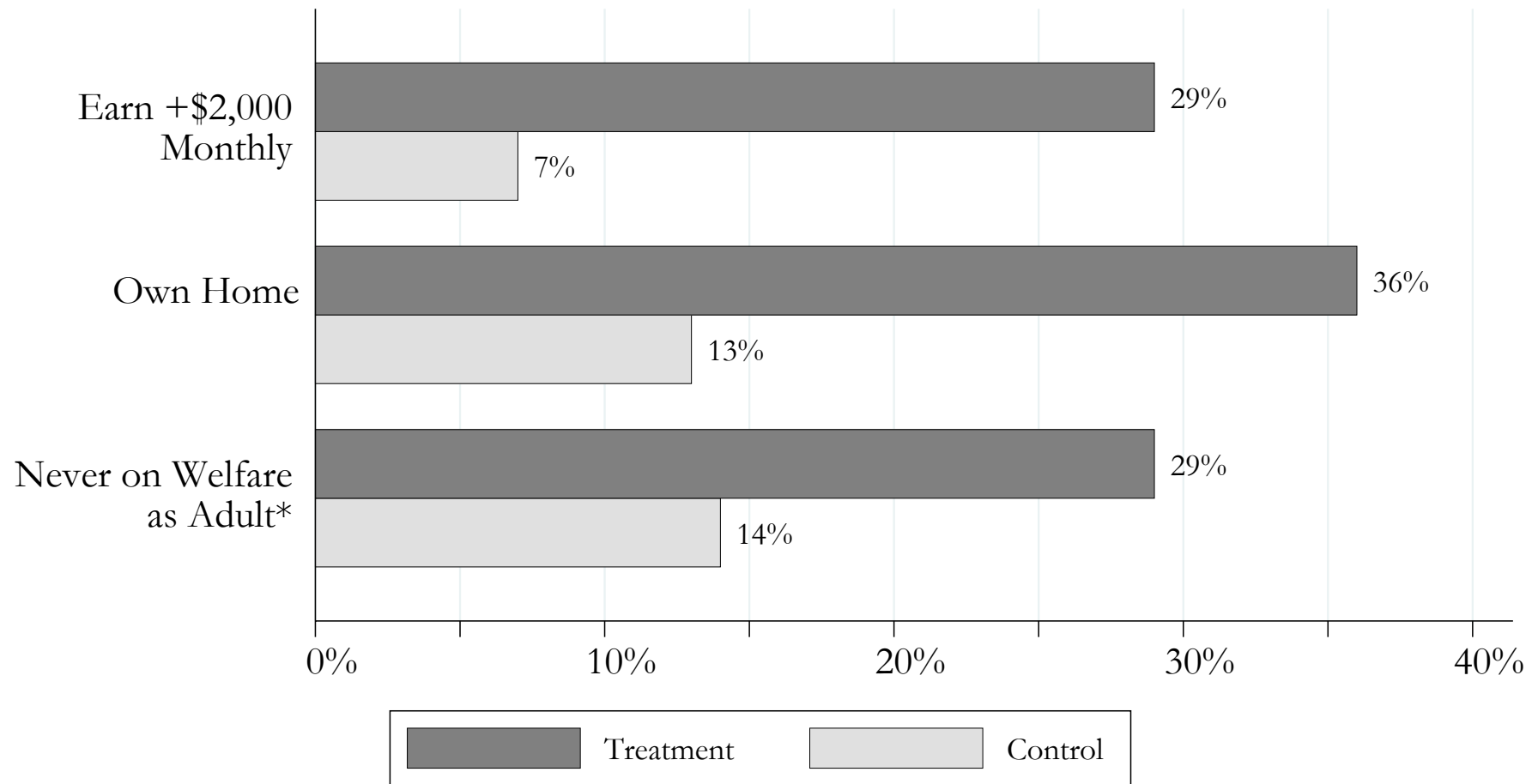
Perry Preschool Program: Educational Effects, by Treatment Group



Source: Barnett (2004). *High achievement defined as performance at or above the 10th percentile.

Figure 6c

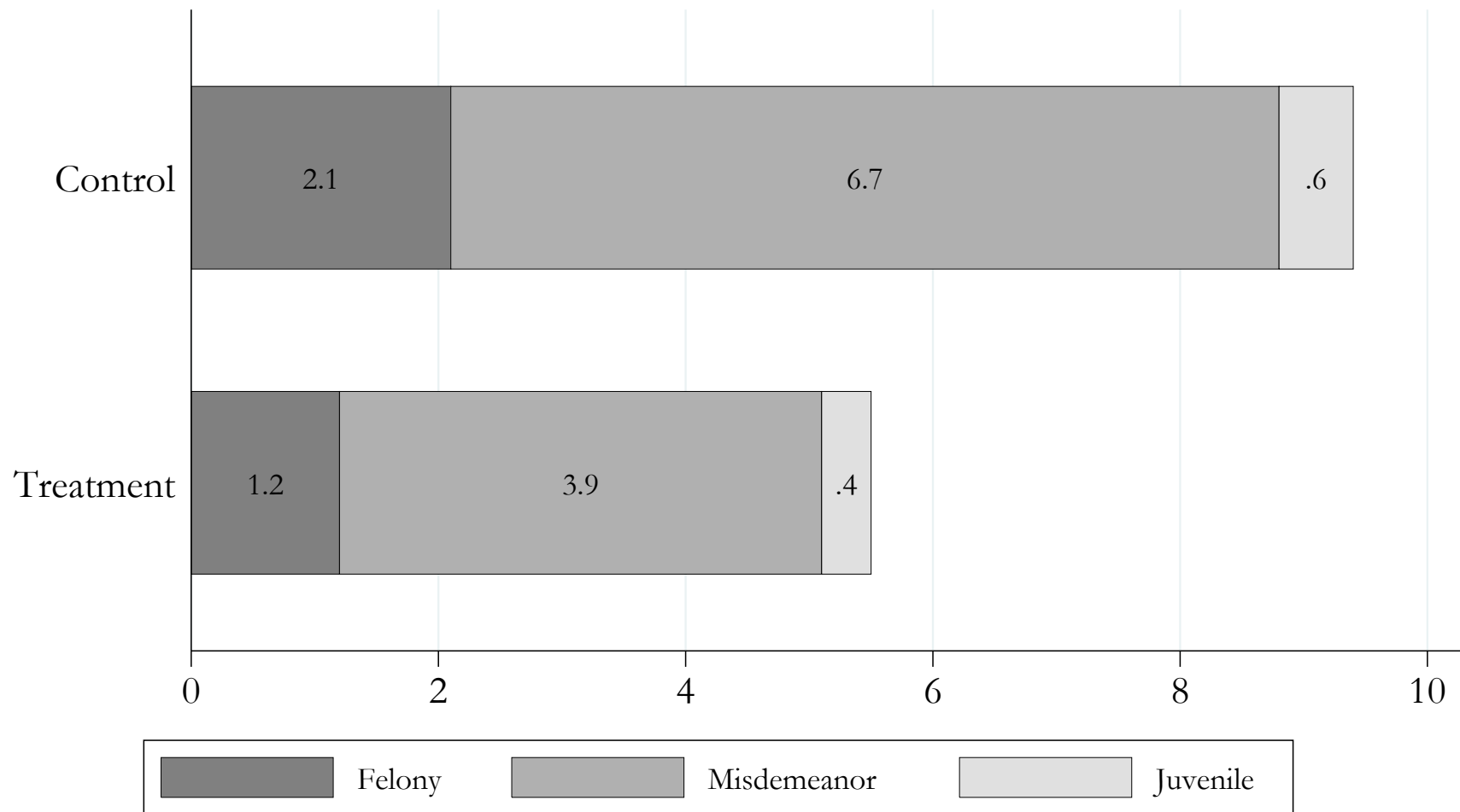
Perry Preschool Program: Economic Effects at Age 27, by Treatment Group



Source: Barnett (2004). *Updated through Age 40 using recent Perry Preschool Program data, derived from self-report and all available state records.

Figure 6d

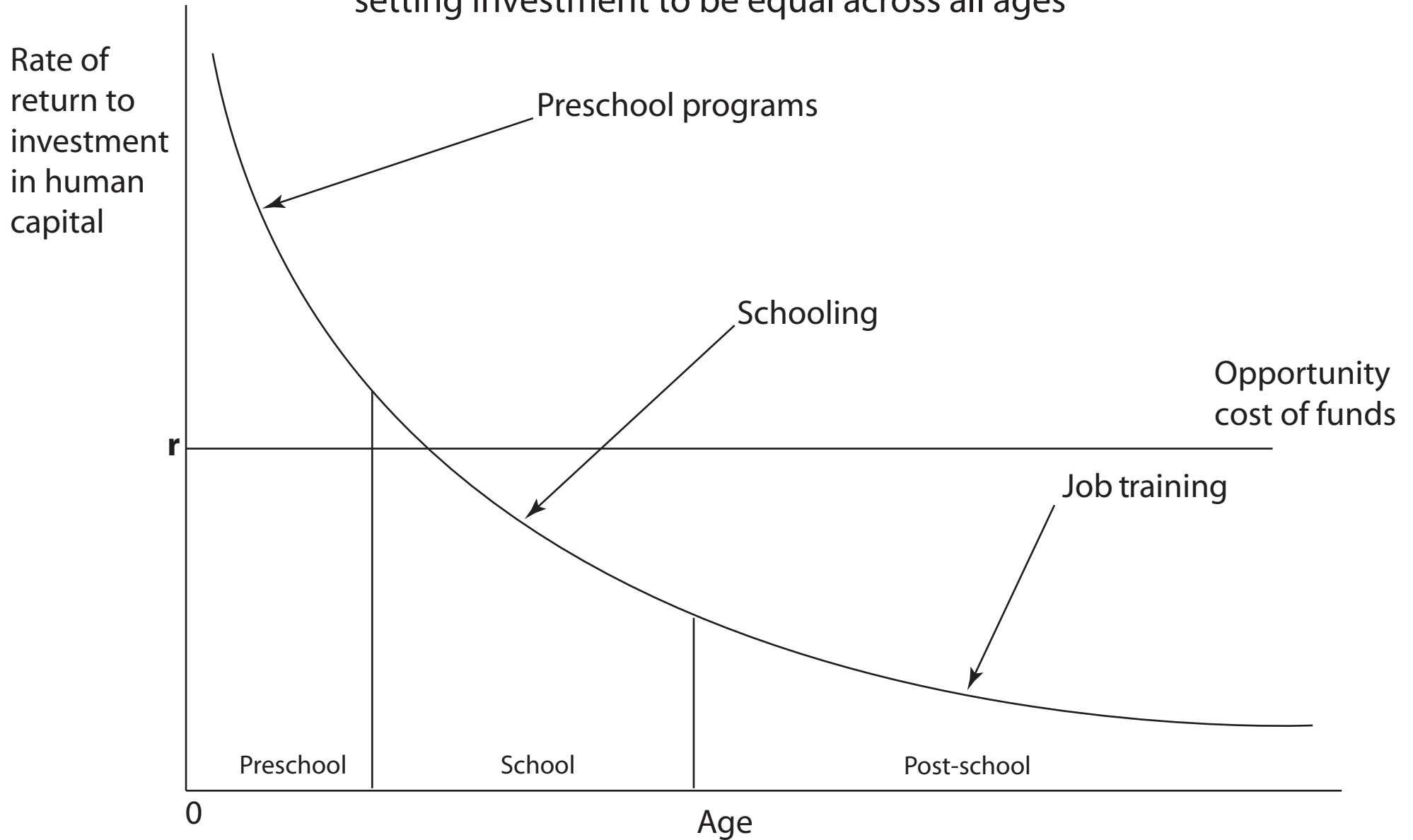
Perry Preschool Program: Arrests per Person before Age 40, by Treatment Group



Source: Perry Preschool Program. Juvenile arrests are defined as arrests prior to age 19.

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