

# Learning from Your Environment

Do social networks predict beliefs and outcomes of teenage youth?

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October 2022

## Abstract

In this paper I use the NLSY97 to examine how a teen's social environment including high school peers, parents, and adults of the same race and gender affect beliefs about arrest, work, school, and early parenthood while controlling for measures of cognitive skills, risky behavior, adverse shocks, and family wealth. I then investigate whether these beliefs predict future outcomes while controlling for the same rich set of controls. I find that teens who come from social environments with less educational attainment, more crime and more sex at young ages are more pessimistic about educational attainment and believe that the risk of arrest following serious crimes is lower. They also believe they are more likely to be arrested, a parent young, and have to work more than 20 hours as a teenager than similar teens from more affluent backgrounds. I then find that a 10 percentage point increase in self reported beliefs about an outcome is associated with a 1-4 percentage point increase in the actual outcome occurring. Then using a Oaxaca Blinder decomposition I show that group average differences in beliefs can explain 13% of Black-White arrest gaps and 13% of Hispanic White High School dropout gaps. Average differences in social network can also explain between 9-50% of Black and Hispanic early parenthood gaps with respect to White respondents.

**Acknowledgement:** This research was conducted with restricted access to Bureau of Labor Statistics (BLS) data. The views expressed here do not necessarily reflect the views of the BLS.

# 1 Introduction

Common wisdom and the consensus of education research insists that increasing schooling, avoiding incarceration and delaying parenthood are effective ways to achieve more economic security in adulthood, especially for youth from more disadvantaged backgrounds. However recent research has suggested that an adolescent's social environment can also be an important determinant for economic success (Chetty, Friedman, Hendren, Jones, and Porter 2018, Chetty, Jackson, Kuchler, Stroebel, et al 2022). Could beliefs about the future be one way that social environment shapes future outcomes?

A teen's social environment can influence their perceptions on the returns to different time expenditures and the likelihood of future outcomes. Living in environments where a teen's demographic group has less representation among college grads can teach teens that higher education is an unlikely avenue of success for them. Likewise living in environments with high crime and early parenthood can teach teens that risky behavior is less harmful than others perceive. Teens from these environments would thus believe returns to college are lower, college completion is less likely, and getting arrested or becoming a parent young is more likely for people like them. Thus they would be incentivized to invest less in education and more in risky activities at young ages.

In this paper I explore to what extent 15-16 year old teen's beliefs about arrests, parenthood, school, and work are correlated with employment, education, and risky activity of peers, parents, as well as adults from the same census tract of the same race, ethnicity and gender. I do this by merging individual level characteristics, including beliefs and human capital measures from the NLSY97 to census tract level outcomes by race, ethnicity and gender from the 2000 Decennial Census. I then use OLS to regress beliefs about these outcomes occurring in the future on peer composition, parent history, neighborhood and county level outcomes while holding measures of cognitive skills, past participation in risky

behavior, family wealth, exposure to adverse events, and demographics constant. I then examine to what extent these beliefs are correlated with corresponding future outcomes while using the same rich set of controls.

I find that social networks are highly predictive of a teen's beliefs about future outcomes holding measures of family wealth, cognitive ability, geography and past participation in risky behavior constant. Specifically, I find that teens that are surrounded by more positive education experiences like high school or college completion, and less risky behavior like crime or early parenthood are more likely to believe that they will finish high school and have a degree by age 30. They are also less likely to believe they will have to work more than 20 hours while in high school, and less likely to believe that they will be a parent by age 20. These teens are also less likely to believe they will actually be arrested and more likely to believe that crime is more risky, measured by the hypothetical probability of arrest conditional on vehicle theft. Interestingly, I find that teens surrounded by more crime, less young pregnancies, and higher high school completion are also more likely to believe they will join the military.

Next I find that these beliefs are strong predictors of future outcomes holding family wealth, academic ability, neighborhood, and past participation in risky behavior constant. More optimism about educational attainment is positively correlated with actual attainment and negatively correlated with early parenthood. Specifically I find that a 10 percentage point increase in belief of graduating high school is associated with a 4.3 percentage point decrease in being a high school drop out. A 10 percentage point increase in belief of having a college degree by age 30 is associated with 1.8 percentage point increase in actually having a degree by age 30 and 0.5 percentage point decrease in being a parent by age 20.

Similarly, believing arrests or parenthood is more likely is positively correlated with dropping out of high school, actual arrests, and early parenthood. Specifically, a 10 percentage point increase in belief of being arrested within the next year is associated with a 2.4

percentage point increase in experiencing an arrest event. A 10 percentage point increase in belief of being a parent by age 20 is associated with a 1.3 percentage point increase in actually being a parent by age 20, 1.1 percentage point increase in being arrested, and 1.3 percentage point increase in dropping out of high school. Finally, believing that military service is likely or very likely is associated with a 10.6 percentage point increase in actual military service.

Demographic differences in belief and social environment can even explain a significant portion of racial and ethnic gaps in criminal justice and education outcomes. Specifically using a Oaxaca Blinder decomposition I find that group average differences in these beliefs explain 8% of Black-White high school completion gaps, 13% of Black-White arrest history gaps, and 40% of Hispanic-White High School dropout gaps. Group average differences in parent history, peer, and neighborhood level outcomes can explain between 10-58% of Black and Hispanic early parenthood gaps with respect to White respondents. Differences in family history can explain between 30-70% of Bachelors attainment gaps with respect to White respondents.

Altogether these results suggests that growing up in communities with worse education outcomes, more crime, and early pregnancies may steer youth away from higher education, and more towards non college work, early parenthood or crime. Caution is warranted in interpreting these results since differences in beliefs could be rational and reflect actual systematic differences that affect the individuals and their social environment. This can include differences in school quality, exposure to adverse events, segregation, discrimination, and access to birth control. However, it is also possible that these beliefs reflect information frictions or uncertainty where teen's beliefs are the result of placing excessive weight on social environment and insufficient weight on actual ability and history. In either case we'd expect this relationship between social environment, beliefs, and outcomes.

In either case the evidence presented here suggests that the strong correlation between

social environment, beliefs, and outcomes should be incorporated into future economic analysis. If these beliefs primarily reflect rational responses to systemic challenges then they provide a useful proxy to help economists deal with unobservables from the econometrician's perspective. On the other hand if they reflect information frictions on the agent's side then outcomes can be improved using information campaigns targeting high achievers from less affluent backgrounds.

## 1.1 Literature Review

This paper builds on the existing literature examining the relationship between information frictions and economic inequality. Much of the literature has focused exclusively on education, where beliefs examined include college outcomes, academic ability, and the net returns to schooling.

For instance Streufort 2000, proposes that since youth from lower income backgrounds are more exposed to lower income adults, they will underestimate the returns to college. Consistent with this theory Horn, Chen, and Chapman 2003, found that students from lower income backgrounds overestimate the costs of attending college. Similarly, Bleemer and Zafar 2018 find that youth from lower income and non college educated backgrounds exhibit more bias in the perceived net returns to college. Contrary to this theory is the finding that despite the average Black youth coming from a lower educated and lower income household, Black youth are equally likely or more likely to be optimistic about education attainment than White youth (Cook and Ludwig 2007, Barrera 2021).

In higher education these beliefs can influence decisions. Stinebrickner and Stinebrickner 2014a showed that differences in beliefs about college ability and learning through grades can explain up to 45% of college dropout at Berea College, a private liberal arts school that primarily serves low income students. Wiswall and Zafar 2015 showed that beliefs about economic returns to different majors are related to major choice. Beliefs about

self-efficacy, how well a student will perform in their studies, has been shown to be strongly correlated with STEM enrollment (Stinebrickner and Stinebrickner 2014b) and lower rates of self efficacy rates among high ability women explains lower persistence in STEM (Saltiel 2021).

The paper most related to this study is one by Deluca, Papageorge, Boselovic, Gehrshenson, Gray, Nerenberg, Sausedo, and Young 2021. In this paper the authors combine the NLSY97 with qualitative open ended surveys of disadvantaged Black youth from Baltimore to explore how adverse events effect education outcomes. The authors find that youth who experienced events like homelessness, witnessing a shooting, being a victim of violence, parental death or divorce, and family hospitalizations are less likely to believe they will earn a degree by age 30 and more likely to believe they will experience negative events like death, pregnancy, or arrests. These beliefs in turn lead youth from these backgrounds to seek shorter more flexible education programs that allow them to complete their studies if these negative events were to occur again.

I contribute to this literature by providing empirical evidence that social environment is strongly related to not only education but also to other outcomes like arrests, work, military service, early parenthood and corresponding beliefs about these outcomes. My results suggests that in addition to important covariates like human capital, access to resources, and experiencing adverse events, teens expectations about the future are also strongly related to their social networks. Furthermore after controlling for these covariates I find that actual education attainment, arrest, parenthood and military outcomes are strongly related to beliefs recorded when respondents were between 15-16 years old. Overall my findings suggest that teen's social environment not only influences percieved returns to schooling but also the relative tradeoffs between risky behavior like crime and sex at young ages, school and work. A finding consistent with research demonstrating the interrelatedness of crime and school (Lochner 2004, Lochner & Moretti 2004, Baron, Hyman & Vasquez 2022).

## 2 Data and Sample Selection

The data set that I use for this analysis is the 1997 wave of the National Longitudinal Study of Youth (NLSY97), as well as year 2000 Decennial Census files containing neighborhood level outcomes by race, ethnicity and gender. I merged the two data sets using the census tract information recorded in the geocoded version of the NLSY97.

The NLSY97 is a longitudinal data set that follows individuals from 1997 to the present day and is designed to be representative of youth born in the continental United States between 1980-1984. The NLSY97 is useful for this study because it collects rich data on human capital measures, family and social environment, as well as participation in activities like work, crime, sex, and school. The sample also has a relatively large sample size of Black and Hispanic Americans, due to these populations being intentionally over sampled.

The Decennial Census files include tract level outcomes of adults by gender, race, and ethnicity. These outcomes include employment, unemployment, median earnings for full time workers over the age of 18, veteran/military status of those 18 and up, as well as educational attainment for those 25 and up. Since crime and early parenthood at the tract level were not available in the Census files, I used county level crime rates and percentage of births to young mothers from the year 1990 in the geocoded version of the NLSY97. Other geographical controls include state fixed effects, county level rates of Black and Hispanic identification, and categorical variables for whether the individual lived in an urban, rural, or other area at the start of the survey.

Whenever possible I use outcomes for adults of the same race, ethnicity and gender. The exception being that I use pooled outcomes for county level crime, and young births. I also used pooled neighborhood outcomes for youth who live in census tracts where only pooled statistics are available<sup>1</sup>.

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<sup>1</sup>Youth in these tracts compose less than 5% of the sample. Pooled statistics might only be available because these youth live in census tracts with less minorities. To control for any differences I include an

I use adults of the same race, ethnicity and gender because multiple studies have demonstrated strong correlations between outcomes of youth and demographically similar adults. Examples include women inventors increasing female inventor rates (Bell, Chetty, Jaravel, Petkova, and Van Reenan 2019), women STEM professors increasing woman student's future STEM job and graduate study rates (Mansour, Rees, Rintala, & Wozny 2018), Black and Hispanic teachers positive impact on student performance (Dee 2005, Rocha and Hawes 2009), and Black principals positive impact on Black teacher retention and job satisfaction (Grisson and Kaiser 2011).

Beliefs analyzed in this study cover a wide span of different activities ranging from education, work, arrests, to sex. I restrict the sample so that beliefs are collected for the survey years when respondents were between 15-16 years old. Individuals report beliefs about actual outcome realizations as well as hypothetical outcomes. Belief measures used in the analysis include self reported probabilities, measured in percentages, of having a degree by age 30, graduating high school by age 20, being in school next year, working more than 20 hours next year conditional on continuing or dropping out of school, having a child by age 20, having a child next year, being incarcerated by age 20, being arrested next year, and being arrested conditional on having stolen a car. I will also examine self reported likelihood of joining the military which is measured on a 1-5 scale, where 1 is not likely and 5 is very likely.

Peer measures used are reports from the first year of the NLSY97, of the percentage of students in the same grade at the same school that have college plans, are having sex, or that cut class. The peer variables are measured on a scale of 1-5 where each unit increase corresponds to approximately a 25 percent increase of peers with the reported characteristic. Parent outcome measures were also collected during the 1997 interview and include average years of parents schooling, mother's age at first birth, and indicators for whether parents 

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indicator for whether census tract statistics are pooled.



served in the military or were incarcerated. I also used Household net worth as a measure of family resources.

The NLSY97 also has a rich set of controls for cognitive ability and socio-behavioral skills. In this study cognitive ability is measured by self reported 8th grade GPA, high school GPA from transcripts, and Armed Services Vocational Aptitude Battery (ASVAB) Armed Forces Qualification Test (AFQT) score. Where AFQT is the respondent's percentile core for the math and verbal portions of the ASVAB.

I also control for socio-behavioral skills or risky behavior as recommended by Hai & Heckman 2017. The risky behavior measures used are indicators for whether respondent's had sex by age 15, stole more than \$50 before 1997, and intentionally attacked or harmed someone before 1997. Additionally I also use an indicator for whether the respondent reported being suspended from school between the ages of 10-15.

Finally, similar to Deluca, Papageorge, Boselovic, Gehrshenson, Gray, Nerenberg, Sausedo, and Young 2021, I also control for adverse individual shocks, and adverse family shocks. For individual shocks I use an index that ranges between 0 and 6 and counts how many of the following events occurred; had ever felt unsafe before 1997, home broken into by age 18, seen a shooting by age 18, been bullied by age 18, was a victim of violence between 1997-2002, and experienced homelessness between 1997-2002. For family shocks I use a similar index ranging between 0 and 6 that counts how many of the following events occurred; not living with both parents in 1997, parents divorced by 1997, mother not employed by 1997, father not employed by 1997, any parent dead by 1997, and a member of the household hospitalized between 1997-2002. Since some of these events occurred after beliefs were recorded, any strong correlations between these and the belief variables could reflect anticipation of these events occurring.

I drop respondents who are missing data for all of the covariates with the exception of likelihood of military service, since only a subset of respondents have this information

available. Certain belief measures were only collected for the 1980-1981 cohorts while others were asked of all cohorts. Results will indicate which cohorts were used. I add a year of birth fixed effect for each analysis in order to control for the reporting of beliefs in different years or different versions of similar beliefs for different birth cohorts. I also keep respondents only if they identify as White Non Hispanic, Black of any ethnicity, and Hispanic since other racial/ethnic groups have very small sample sizes.

### **3 Analysis**

In this section I perform three separate analysis to see how social environment affects beliefs, how beliefs affect outcomes, and how inequality in outcomes is linked to inequality in beliefs and social environment. In section 3.1 I explore to what extent neighborhood, peer and parent attributes are associated with beliefs about future work, college completion, high school completion, arrest, pregnancy at young ages, and military service, while controlling for human capital, risky behavior, and family resources. Then in section 3.2 I examine to what extent future outcomes related to work, school, arrests, military service, and having children before age 20 is correlated with beliefs, while holding neighborhood outcomes parent attributes, human capital, and family resources constant. Finally in section 3.3 I conduct a Oaxaca blinder decomposition to see how much racial and ethnic inequality can be explained by beliefs, neighborhoods, parent attributes, peer attributes, and human capital measures.

In subsection 3.1 I examine the relationship between social environment and beliefs about future outcomes. The main questions of interest is as follows do teens expectations of the future correspond with outcomes in their social environment. For example are teens who are surrounded by more risky behavior like crime, cutting class, or sex at young ages believe that arrests, or early parenthood are more likely, holding skill measures and family resources constant. Or are teens who are surrounded by more educational achievement or

more positive education aspirations more likely to believe college and high school completion are more likely, holding ability and family resources constant.

This question will be answered by using OLS to regress belief measures on peer, parent, neighborhood and county level attributes while holding household net worth, cognitive ability and risky behavior constant. The belief measures that will be examined are likelihood of military service, and self reported probabilities of being in school next year, graduating high school by age 20, having a four year degree by age 30, being arrested within the next year, chance of arrest if one were to steal a vehicle, being a parent by age 20, and probability of working 20 plus hours conditional on dropping out and conditional on staying in school.

The question will be answered by estimating equation 1.1. The subscript  $i$  represents individual respondent  $i$  while  $j$  denotes the specific belief measure.

$$(1.1) \quad \text{Belief}_{i,j} = \gamma_0 + \vec{\gamma}_{peer,j} \vec{Peer}_i + \vec{\gamma}_{par,j} \vec{Parent}_i + \vec{\gamma}_{T,j} \vec{Tract}_i \\ + \vec{\gamma}_{C,j} \vec{County}_i + \vec{\beta}_j \vec{X}_{i,j} + \varepsilon_{i,j}$$

The vector  $\vec{Peer}_i$  measures peer attributes including percent with plans for college, cutting class, and having sex.  $\vec{Parent}_i$  measures parent's history including average years of schooling, mother's age at first birth, incarceration and military service history.  $\vec{Tract}_i$  measures tract level outcomes for adults of the same race, ethnicity, and gender. It includes education rates for specific outcomes like high school completion, some college, and bachelor's or more. The  $\vec{Tract}_i$  vector also includes military service rates for those 18 and up, as well as unemployment rates and median full time earnings for population 16 and up. The vector  $\vec{County}_i$  includes percent of births to young mothers, crime rate, percent Black, and Hispanic in 1990. Additionally  $\vec{X}_i$  is a vector of controls including cognitive ability measures, past participation in risky behavior, household net worth, year of birth, urban rural indicators,

sex, race and ethnicity.

Then after examining the relationship between beliefs and social environment, in subsection 3.2 I examine the relationship between beliefs and outcomes, to evaluate whether meaningful differences in beliefs about the future are strongly correlated with actual outcomes. To do this I will use OLS to regress outcomes on corresponding beliefs and controls for social environment, cognitive ability, socio-behavioral measures, household wealth.

The equation that is estimated is given by equation 1.2, below. The subscript  $i$  represents individual respondent  $i$  while  $j$  denotes the specific outcome measure.

$$(1.2) \quad Outcome_{i,j} = \alpha_0 + \vec{\alpha}_{belief,j} \vec{Belief}_i + \vec{\alpha}_{peer,j} \vec{Peer}_i + \vec{\alpha}_{par,j} \vec{Parent}_i \\ + \vec{\alpha}_{T,j} \vec{Tract}_i + \vec{\alpha}_{C,j} \vec{County}_i + \vec{\delta}_{oj} \vec{X}_{i,j} + \varepsilon_{i,j}$$

Equation 1.2 is similar to equation 1.1. There are a couple of differences. First subscript  $j$  now corresponds to outcomes. The outcomes are high school dropout, college degree by age 30, ever been arrested, became a parent by age 20, and served in the military. Additionally belief measures have been included in the regression.  $\vec{Belief}_i$  includes belief of graduating high school, having a degree by age 30, likelihood of military service, probability of becoming a parent by age 20, probability of arrest within the next year, probability of working more than 20 hours at age 30, and probability of arrest if stole a car.

Finally after estimating equation 1.1 and 1.2, in subsection 3.3. I conduct a Oaxaca Blinder decomposition to determine to what extent differences in beliefs, social environment, academic ability, socio-behavioral skills can explain racial and ethnic inequality in early parenthood, arrest history, high school completion, and college completion. The results are reported in the following subsections.

Table 1: School Beliefs

VARIABLES	Prob School Next Year	Prob HS Grad by 20	Prob Prob Deg by 30
Reported 8th grade GPA	0.5266 (0.4783)	2.0885** (0.9441)	8.4886*** (1.2227)
Tract: Pct HS Diploma Only	0.0301 (0.0671)	0.1179** (0.0515)	0.3311*** (0.1242)
Tract: Pct Some College	-0.0268 (0.0380)	-0.0217 (0.0475)	-0.0442 (0.1087)
Tract: Pct Bachelors +	-0.0196 (0.0470)	-0.0452 (0.0507)	0.1196 (0.1011)
Avg Years of Parents Schooling	0.9064*** (0.2466)	0.6023*** (0.2199)	2.5043*** (0.5624)
Pct Peers College Plans (25 ppts)	0.5155 (0.3344)	1.8272** (0.7117)	5.0087*** (0.7101)
County: Crime per 1k people	0.0211 (0.0224)	0.0262* (0.0144)	-0.0425** (0.0193)
Pct Peers had Sex (25 ppts)		0.5647* (0.3347)	-1.5043** (0.7058)
Parent Serve in Military	0.2564 (0.7118)	1.4814* (0.7644)	1.0971 (1.4788)
Constant	84.5800*** (5.3937)	65.4903*** (6.2247)	-22.5834 (14.3205)
Observations	2,742	1,528	1,528
1980-1981 Cohort	Yes	Yes	Yes
1983-1984 Cohort	Yes	No	No
State Fixed Effects	Yes	Yes	Yes

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

### 3.1 Belief Analysis Results

The results for beliefs about schooling outcomes are reported in Table 1. The full list of results showing results for all covariates is reported in the appendix. Table 1 shows holding all other controls constant, coming from an environment with more educational attainment and aspirations is positively correlated with youth's own aspiration for school.

For instance suppose we are comparing two youth from the same community, who have the same race, ethnicity, gender, cognitive ability, parental wealth, and participation in risky behavior. Then we'd expect to see that the youth with college educated parents believes they are 3.6, 2.4, and 10 percentage points more likely to stay in school, graduate high school by 20, have a degree by 30 than the youth who's parents only have a high school diploma. Similarly if all other controls are constant, but one youth has 25 percent of their high school class planning on going to college but the other has 50% of their high school class planning on going to college, then the youth with more peers with college plans believes they are 1.8 and 5.01 percentage points more likely to graduate high school and college respectively than the youth with less peers with college plans.

The share of adults of the same race, ethnicity and gender that have a high school diploma is also strongly positively correlated with beliefs about high school completion and degree attainment. A percentage point increase in percent of similar adults with high school degree only is associated with an increase in belief of high school of 0.12 percent and degree attainment by 0.33 percent. The share with some college is negatively correlated with belief of high school completion and degree attainment but is not statistically different from zero.

The relationship between social network's involvement with risky behavior is mixed. On the one hand, holding all other controls constant more crime and peers having sex is positively correlated with belief of high school completion. On the other hand it is negatively correlated with belief of having a degree by age 30. Having parent's with military service history is also positively correlated with belief of high school completion.

Table 2: Beliefs Arrest &amp; Parenthood

VARIABLES	Prob Arrest Next Year	Prob Arrested   Stole Car	Prob Parent by 20
Ever had Sex by age 15	3.5279*** (0.6837)	-7.0346*** (2.2750)	8.9518*** (1.2952)
County: Crime per 1k people	0.0260* (0.0143)	-0.0945** (0.0410)	0.0490** (0.0227)
Parent Ever in Jail	3.6199** (1.7044)	-8.1541** (3.9747)	6.1406** (2.7823)
Pct Peers Cut Class (25 ppts)	0.8497*** (0.2280)	0.9114 (0.9678)	0.1987 (0.5654)
Pct Peers had Sex (25 ppts)		-0.1221 (0.8366)	1.7990*** (0.5620)
Victim Shocks	1.0885** (0.4286)	-1.0101 (1.3159)	0.0032 (0.9515)
Tract: Pct HS Diploma Only	-0.0070 (0.0568)	0.3675*** (0.1284)	0.0664 (0.0988)
Avg Years of Parents Schooling	0.1735 (0.1488)	-0.6275 (0.7961)	-0.6974* (0.3893)
Pct Peers College Plans (25 ppts)	0.4653 (0.3297)	2.8593** (1.2481)	-0.4499 (0.4952)
Constant	5.1618 (4.6997)	50.6843*** (15.0871)	21.9754** (9.3952)
Observations	2,742	1,528	1,528
1980-1981 Cohort	Yes	Yes	Yes
1983-1984 Cohort	Yes	No	No
State Fixed Effects	Yes	Yes	Yes

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 2 shows results for beliefs about arrest and parenthood. It also includes a measure for how risky youth believe crime is, measured by probability of getting arrested if one were to steal a car. Here we see that if a teen's social network has more participation in risky behavior then they are more likely to believe crime is less risky. They also believe that actual arrest within the next year and parenthood by age 20 is more likely.

Specifically holding all other controls constant, including academic ability and past risky behavior, having a parent who has ever been incarcerated is associated with an 8.2 percentage point decrease in hypothetical belief of getting arrested if stealing a car, a 3.6 percentage point increase in belief of actually getting arrested within the next year, and 6.1 percentage point increase in belief of actually being a parent by age 20. Holding all else constant, if the amount of a teen's peers who had sex increases by 25 percentage points, then that teen will believe they are 1.8 percentage points more likely to be a parent by age 20.

Social networks education aspirations and history is also related to beliefs about crime risks and parenthood. Specifically holding all else constant if one teen has parents with a high school diploma and one teen has parents with a college degree, than the youth with college educated parents believes they are 2.79 percentage points less likely to be parents young. Holding all else constant if the youth's share of peers with college plans increased by 25 percentage points or if the amount of similar adults with a high school diploma increases by 7.8 percentage points than they believe they are 2.86 percentage points more likely to get arrested if they steal a car. Thus coming from a more educated background leads one to believe car theft is more risky.

In this way coming from an environment with more risky behavior, less high school completion, and less college plans is associated with youth believing crime is less risky, and actual young parenthood and arrest appearing as more likely. Taken together with Table 1, these youth also believe they will have less education attainment as well.



Table 3 shows results for beliefs related to work as a teen and serving in the military. Here we see that more exposure to risky behavior like crime is positively associated with believing that military service is more likely. The effect of sex at young ages however depends on type of exposure. For instance younger age of mother's first birth is associated with believing military service is more likely, while more of your class mates having sex is associated with believing military service is less likely. More peers cutting class, more young births, and younger first birth age of mother's is also associated with believing that working more than 20 hours a week as a teen is more likely. This holds for both hypothetical situations, whether the teen continues high school or drops out.

The effect of being exposed to education depends on the type of exposure to education. Overall more parental education is associated with a lower perceived likelihood of having to work while in school. This could reflect that there is less of a perceived need to work while in school. Consistent with this is that higher household net worth has a negative association with belief of working while in school, and more adverse shocks affecting your family is positively associated with belief of working while in school. This could mean that youth from lower socioeconomic households, may be more likely to believe they have to work to supplement their families income or assist with negative shocks.

Percent of similar adults with a high school diploma is positively correlated with the belief of having to work while in high school, and is also positively correlated with the likelihood of serving in the military. Being exposed to more military either through your parents or neighborhood is also positively correlated with likelihood of working more than 20 hours a week, whether the individual continues school or drops out.

Table 3: Work Beliefs

VARIABLES	Prob Work   No School	Prob Work   School	Likelihood Serve Military
Suspended 10-15 years old	0.9095 (1.1760)	4.7654*** (1.5484)	0.0006 (0.0827)
Tract: Unemployment Rate	-0.2843*** (0.1074)	-0.1379 (0.1297)	0.0145 (0.0095)
Tract: Pct HS Diploma Only	0.0290 (0.0978)	0.2238** (0.0923)	0.0112** (0.0052)
Tract: Pct Ever Military	0.1393** (0.0647)	0.1772** (0.0894)	0.0066 (0.0058)
Parent Serve in Military	1.6731 (1.0306)	2.9300** (1.4572)	0.0850 (0.0804)
County: Crime per 1k people	0.0307 (0.0288)	0.0362 (0.0324)	0.0028** (0.0013)
Pct Peers Cut Class (25 ppts)	0.9499** (0.4615)	1.4772*** (0.5172)	0.0315 (0.0326)
Pct Peers had Sex (25 ppts)			-0.0577* (0.0320)
Pct Births Mother Under 20 County	-0.2237 (0.1823)	-0.4036* (0.2261)	-0.0048 (0.0101)
Mom's Age at First Birth	-0.2722** (0.1236)	-0.3059* (0.1804)	-0.0139* (0.0083)
Avg Years of Parents Schooling	0.1249 (0.2665)	-1.5330*** (0.3490)	0.0010 (0.0232)
HH Net Worth (\$10k)	-0.0258 (0.0313)	-0.0922** (0.0382)	0.0009 (0.0019)
Family Shocks	-0.2702 (0.4541)	1.1885** (0.4812)	-0.0331 (0.0270)
Constant	83.0050*** (7.7853)	71.9101*** (7.9957)	2.4752*** (0.3841)
Observations	2,742	2,742	1,310
1980-1981 Cohort	Yes	Yes	Yes
1983-1984 Cohort	Yes	Yes	No
State Fixed Effects	Yes	Yes	Yes

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Interestingly, there is also a negative association between unemployment rate of demographically similar adults and belief of working more than 20 hours conditional on dropping out of school. The association is also negative for working while in school, and positive for likelihood of serving in the military. However for the latter two the results are not statistically significant.

Overall table 3 shows that holding human capital and own risky behavior constant, more exposure to risky behavior like sex at young ages and crime, more exposure to demographically similar high school graduates, and coming from a household with less parental education and resources is positively correlated with belief of having to work more than 20 hours as a teenager and later serving in the military.

Taking tables 1 through 3 together paints a very interesting picture of how teen's perceive the future. The results suggests two different perspectives of the future for teens with similar levels of academic ability and past risky behavior but differences in social environment. For instance suppose we have a teen who's parents have a college education, who's neighborhood has less high school dropouts, less crime, and less young births in their neighborhood. Suppose we compare this teen's beliefs to a teen who comes from a neighborhood with more crime, more young births and less high school completion. The teen from the more affluent background is more likely to believe they will stay in school next year, and less likely to believe they will have to work more than 20 hours while in school. They will be more likely to think crime is more risky, and less likely to believe that they will be arrested or be a parent by age 20. They not only believe they will be more likely to graduate high school but more likely to believe they will have a college degree by age 30.

Interestingly, for the youth from the higher crime and early parenthood environment small changes along a few dimensions can change perspectives. If there were more high school completion and more exposure to military service, than this teen would be predicted to have a higher perceived likelihood of graduating high school, and a perception that crime is more

risky. Additionally this would be associated with an increased belief of working more than 20 hours and joining the military. On the other hand if there is less high school completion and more unemployment of similar adults, than this would not only be associated with a higher perceived likelihood of dropping out, but also less likelihood of working as a dropout, and a perception that crime is less risky. In this way even if a teen grows in a high crime and high early birth area, more high school completion, better employment outcomes, and perhaps more military service would steer a youth away from behavior that leads to arrests and more towards high school graduation and entering the non-college labor force.

In the next subsection I examine how well these beliefs actually correspond to reality, by examining the relationship between these beliefs and education, military service, arrest, and early parenthood outcomes.

## **3.2 Outcomes Analysis**

In this section, I now examine the relationship between these beliefs and future outcomes. If these beliefs are correlated with future outcomes, then it suggests that studying belief formation and determinants of beliefs would be useful for economists studying inequality. These beliefs can be due to information frictions that can be alleviated by salient information campaigns. Or these beliefs may reveal systemic inequities not observed by econometricians, that agents are rationally incorporating into their information sets and decision making.

Table 4 shows the relationship between beliefs and outcomes by presenting results from the estimates of equation (1.2). Table 4 shows that holding cognitive ability, family resources, and past risky behavior constant, that beliefs, especially those corresponding to outcomes, are highly correlated with future outcomes.

Specifically, holding all controls constant a 10 percentage point increase in self reported probability of completing high school, is associated with a 4 percent decrease in actual probability of dropping out of high school. Holding all controls constant, a 10 per-

centage point increase in probability of earning a college degree is associated with a nearly 2 percentage point increase in actual probability of having a degree by age 30. A 10 percentage point increase in probability of being arrested in the next year, is associated with a nearly 2 percentage point increase in actual probability of having been arrested. A ten percentage point increase in belief of being a parent by age 20, is associated with a nearly 1 percentage point increase of actually being a parent by age 20. Finally, believing that serving in the military is likely or very likely is associated with a nearly 11 percentage point increase in actually serving in the military compared to youth who believe military service is unlikely.

There are also interesting patterns of complementary and substitutability in beliefs. Specifically, belief of having a degree and completing high school are both negatively associated with being a high school dropout. However, belief of having a high school diploma is negatively associated with college completion, while having a degree is positively correlated. This may suggest that belief of having a diploma by age 20, is interpreted by teens as just having a high school diploma. Similarly, belief of being arrested within the next year and being a parent by age 20 are both positively correlated with actual likelihood of being arrested. This suggest that participation in crime may also be associated with participation in sex at young ages.

Interestingly there seems to be a contrast between belief of being a parent by age 20, and belief of having a degree by age 30. Belief of being a parent by age 20 is positively associated with being a high school drop out, while belief of having a degree by age 30 is negatively associated with being a parent by age 20. This suggests that teens that see higher education as more likely are less willing to participate in risky behavior like sex at young ages. Youth who think early parenthood is more likely are less likely to finish school, either through less effort, or dropping out because of early parenthood. This suggests that for these youth either the returns to school are lower or the costs of continuing education are higher.

Other interesting patterns emerge when looking at other covariates used as controls.

Table 4: Outcomes

VARIABLES	HS Drop out	College Grad 30	Been Arrested	Parent by 20	Serve Military
Prob HS Grad by 20 (10 ppts)	-0.0426*** (0.0086)	-0.0122** (0.0062)	0.0054 (0.0083)	-0.0050 (0.0090)	0.0052 (0.0045)
Prob Deg by 30 (10 ppts)	-0.0057* (0.0034)	0.0177*** (0.0029)	-0.0024 (0.0038)	-0.0057* (0.0031)	0.0006 (0.0023)
Prob Parent by 20 (10 ppts)	0.0132*** (0.0036)	-0.0013 (0.0037)	0.0109** (0.0051)	0.0128** (0.0052)	-0.0017 (0.0034)
Prob Arrest Next Year (10 ppts)	0.0006 (0.0048)	-0.0060 (0.0057)	0.0242*** (0.0071)	-0.0019 (0.0065)	0.0022 (0.0038)
Military Likelihood: Likely					0.1057*** (0.0297)
Military Likelihood: Very Likely					0.1054** (0.0413)
HH Net Worth (\$10k)	0.0002 (0.0003)	0.0021*** (0.0007)	-0.0000 (0.0006)	-0.0004 (0.0003)	-0.0004 (0.0003)
Family Shocks	0.0024 (0.0062)	-0.0378*** (0.0085)	0.0145 (0.0108)	0.0005 (0.0067)	-0.0038 (0.0042)
Victim Shocks	-0.0011 (0.0113)	-0.0121 (0.0084)	0.0456*** (0.0144)	0.0021 (0.0120)	-0.0005 (0.0097)
Suspended 10-15 years old	0.0446 (0.0351)	-0.0450* (0.0242)	0.1167*** (0.0245)	0.0357 (0.0303)	0.0021 (0.0190)
ASVAB AFQT	-0.0012*** (0.0004)	0.0031*** (0.0006)	-0.0003 (0.0005)	-0.0003 (0.0004)	0.0007** (0.0003)
Constant	1.0987*** (0.1352)	-0.7328*** (0.1649)	0.4017*** (0.1259)	0.4741*** (0.1444)	0.0151 (0.1126)
Observations	1,528	1,528	1,528	1,528	1,310

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Cognitive ability is strongly related to education and military service. Suspensions are positively correlated with being arrested. Family wealth is important when looking at college completion. Negative shocks that affect your family, like unemployment and hospitalization are negatively correlated with completing college, and negative shocks affecting teens, like being bullied, witnessing a shooting, are positively correlated with arrest history.

Taking all the results together suggests that environment affects teens beliefs about the future. These beliefs also strongly predict the future as well. This is not to suggest human capital or adverse shocks are not important. Beliefs also depend on human capital measures, risky behavior, family resources, as well as experiencing or anticipating future shocks. Overall these results suggests that a youths social environment is another important determinant of not only one's aspirations but also one's future.

### **3.3 Oaxaca Blinder Decomposition: Racial/Ethnic Gaps**

In this subsection, I explore to what extent racial/ethnic differences in outcomes can be explained by differences in beliefs, peer activities, parent history, neighborhood, and human capital measures. I do this by performing a Oaxaca Blinder decomposition of outcomes and reporting the percent of the explained gap that is explained by different groups of covariates.

In the NLSY97, there is tremendous inequality in outcomes. For instance, 27% of White respondents have an arrest history, versus 34% of Black respondents. Regarding early parenthood, 11 % of White respondents are parents by age 20, while 20% of Hispanic and 27% of Black respondents are parents by age 20. For education outcomes, 10 percent of White respondents drop out of high school, while 20% of Hispanic, and 21% of Black respondents drop out of high school. Similarly 40% of White respondents have a college degree, while 19% of Hispanic, and 27% of Black respondents have a college degree.

As Tables A1-A4 show, there is also tremendous inequality in covariates. For example, Appendix Table 4 shows that Black and Hispanic youth are more likely to come

from households with lower levels of wealth and parental education. Black and Hispanic households experience higher levels of parental incarceration, younger ages for mother's first birth, less military service, and more adverse shocks that affect the family and the individual respondent.

Black and Hispanic youth are also more likely to have lower measures of academic ability, and higher measures of past risky behavior. They are less likely to have peers with college plans, and more likely to have peers that cut class. They are also more likely to come from communities with more crime, a higher percentage of births to young mothers, less military service, lower median earnings, higher unemployment, and more high school dropouts.

As expected by differences in background, Table A1 shows that Black and Hispanic Teens believe arrests, and early parenthood are more likely, while also thinking that car theft is less risky. They are also more pessimistic about educational attainment. Where Black and Hispanic youth believe High School graduation is less likely on average, while Hispanic youth believe college completion is less likely on average. However consistent with Cook and Ludwig 1997, Black youth believe college degree attainment is equally likely as White youth. As Table A3 suggests these differences in covariates may be due to Black and Hispanic teens living in more racially and ethnically segregated neighborhoods with decreased funding and increased police surveillance. Past research has demonstrated the negative effect of White flight, or White outmigration once Black or Hispanic composition reaches a threshold level such as 10% (Derenoncourt 2022, Card, Mas and Rothstein).

Table 5 shows the relative effects of differences in groups of covariates on Black/White arrest, early parenthood, high school dropout, and college completion gaps. For all four outcomes, we see that cognitive and risky behavioral measures explain a tremendous amount of the gap explained by the linear regression model, ranging between 31% for early parenthood up to 72% of arrests gaps. Once controlling for all of these events, neighborhood outcomes



for similar adults do not compose a statistically significant portion of any of the gaps in outcomes. Family history is important for most outcomes (between 14-22 percent) with the exception of High School dropout, and peers can explain 11% of gaps in early parenthood. Differences in beliefs can explain between 13% of arrest gaps, and 8 % of High School dropout gaps.

Table 6 shows the relative effects of differences in groups of covariates on Hispanic/White early parenthood, high school dropout, and college completion gaps. Arrests are not included because there is little difference in Hispanic/White average arrests. Similar to Black/White gaps, cognitive and socio-behavioral measures explain a tremendous amount of the gap explained by the linear regression model. The amount explained by these measures ranges between 21% for early parenthood up to 59% of college completion gaps. For Hispanic respondents most of this is due exclusively to differences in cognitive ability measures.

Just as with Black respondents, high school peers play a statistically significant role in explaining early parenthood, explaining nearly 10% of the explained Hispanic/White gap. Family History also plays an important role in explaining between 22% to 70% of early parenthood and College completion gaps. Contrary to Black/White gaps, neighborhood can explain a significant portion of early parenthood gaps, explaining 59% of the Hispanic White gap. Beliefs explain about 40% of the Hispanic/Black High school dropout rate.

Overall Table 5 and 6 show that the economics literature is right to focus on differences in human capital since differences in cognitive and past risky behavior comprise a significant portion of explained gaps. However social environment appears to affect outcomes too, especially early parenthood, college completion, and specifically Black/White arrest history gap. Beliefs can also explain a significant portion of minority/White outcome gaps, specifically Black/White arrests gaps, and High School dropout gaps for both Black and Hispanic teens relative to White teens.

These belief gaps can reflect information frictions, or uncertainty that agents have

Table 5: Black vs White Outcomes

VARIABLES	Arrest	Parent by 20	HS Dropout	College
Beliefs	0.0152**	0.0018	0.0146*	0.0018
% of Explained Gap	13.01	0.97	7.97	0.61
Neighborhood	-0.0062	0.0438	0.0179	-0.0058
% of Explained Gap	-5.31	23.51	9.77	-1.96
Family History	0.0259*	0.0257**	0.0048	0.0893***
% of Explained Gap	22.17	13.79	2.62	30.20
Peers	-0.0051	0.0206**	0.0145	0.0098
% of Explained Gap	-4.37	11.06	7.91	3.31
Cognitive	0.0434**	0.0265**	0.0773***	0.1588***
% of Explained Gap	37.16	14.22	42.17	53.70
Socio-behavioral	0.0420***	0.0316***	0.0296***	0.0216***
% of Explained Gap	35.96	16.96	16.15	7.30
Other	0.0016	0.0362***	0.0245**	0.0203
% of Explained Gap	1.37	19.43	13.37	6.87
White Outcome	0.2655***	0.1096***	0.0987***	0.4007***
Black Outcome	0.3394***	0.2668***	0.2176***	0.2694***
explained	0.1168***	0.1863***	0.1833***	0.2957***
unexplained	-0.0429	-0.0291	-0.0643*	-0.1644***
N White	821	821	821	821
N Black	386	386	386	386

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 6: Hispanic vs White Outcomes

VARIABLES	Parent by 20	HS Dropout	College
Beliefs	0.0061	0.0389***	0.0021
% of Explained	3.92	39.25	1.20
Neighborhood	0.0915**	-0.0097	-0.0671*
% of Explained	58.80	-9.79	-38.41
Family History	0.0331**	0.0107	0.1228***
% of Explained	21.27	10.80	70.29
Peers	0.0152***	0.0029	0.0028
% of Explained	9.77	2.93	1.60
Cognitive	0.0249***	0.0499***	0.0983***
% of Explained	16.00	50.35	56.27
Socio-behavioral	0.0078*	0.0030	0.0040
% of Explained	5.01	3.03	2.29
Other	-0.0231	0.0035	0.0118
% of Explained	-14.85	3.53	6.75
White Outcome	0.1096***	0.0987***	0.4007***
Hispanic Outcome	0.2208***	0.2013***	0.1851***
explained	0.1556***	0.0991**	0.1747***
unexplained	-0.0444	0.0035	0.0410
N White	821	821	821
N Hispanic	308	308	308

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

about outcomes influencing time investments, but also could reflect systemic issues that are not captured by these covariates. None of this should be interpreted to mean that neighborhoods or discrimination does not matter as well. Since many of these covariates, including human capital measures are dependent on neighborhoods which reflects historical segregation patterns.

## 4 Conclusion

Overall this paper shows that beliefs about the future, as well as social environment are strong predictors of future outcomes. Specifically I show that holding family resources, cognitive skill measures, and socio-behavioral measures constant, teens that come from an environment with less educational attainment, more crime, and sex at young ages are more pessimistic about future educational attainment, believe crime is less risky, more likely to believe they will have to work more than 20 hours as a teen, and more likely to be arrested and become a parent young.

Additionally, I showed that these beliefs strongly predict future outcomes. Specifically higher perceived likelihood of joining the military is associated with a higher actual likelihood of serving in the military, more optimism about education outcomes is strongly positively correlated with actual education outcomes and negatively correlated with early parenthood. Additionally, a higher perceived likelihood of early parenthood is positively correlated with arrests, parenthood by 20, and high school dropout.

Finally, I also showed that in addition to human capital measures, beliefs and social environment can explain a significant portion of Black/White and Hispanic/White arrests, early parenthood and educational attainment gaps. Beliefs seem important for Black/White arrest gaps, and high school dropout gaps for both Hispanic and Black respondents relative to White respondents. Social environment can also explain minority gaps in arrests, early

parenthood and college completion.

These results suggests that future work should further investigate belief formation and social networks. This can help us further understand how environment effects economic efficiency as well as how systemic inequalities shape outcomes for minorities and low socioeconomic status youth.

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# A Appendix

## A.1 Summary Statistics

Table A1: Beliefs by Race/Ethnicity

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VARIABLES	White	Black	Hispanic
Belief: Prob HS Grad by 20	97.06	94.09	93.01
Belief: Prob Deg by 30	76.66	76.90	72.34
Belief: Likelihood Join Military	1.991	2.284	2.091
Belief: Prob Parent by 20	13.99	20.17	17.65
Belief: Probability Arrested Next Year	7.907	11.60	10.27
Belief: Probability Arrested if Steal Car	62.78	51.93	54.14
Observations	821	399	308

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Table A2: Human Capital Measures by Race/Ethnicity

VARIABLES	White	Black	Hispanic
Reported 8th grade GPA	3.030	2.691	2.780
Transcript High School GPA	2.87	2.47	2.62
ASVAB AFQT	58.91	30.99	40.06
Suspended 10-15 years old	0.198	0.402	0.251
Ever had Sex by age 15	0.283	0.484	0.331
Ever StoleGT50 bf18 Use	0.105	0.114	0.122
Ever Violence bf18 Use	0.233	0.284	0.275
Observations	821	399	308

Table A3: Neighborhood, County and Peers by Race/Ethnicity

VARIABLES	White	Black	Hispanic
Pct of Peers Cut Class	0.440	0.510	0.452
Pct Peers College Plans	0.667	0.577	0.581
Pct Peers had Sex	0.424	0.640	0.419
Similar Adults Pct HS Dropout	15.16	29.56	42.08
Similar Adults Pct HS Diploma Only	31.34	31.14	24.52
Similar Adults Pct College Edu	53.5	39.3	33.4
Similar Adults Unemployment Rate	4.275	11.72	9.121
Similar Adults FT Median Earnings	34,104	26,234	25,656
Similar Adults Pct Ever Military	11.56	9.77	6.4
Pct Births Mother Under 20 County	12.01	15.55	12.51
Serious Crime Per 100k County	4,812	6,248	6,510
Pct of County Black 1990	8.228	28.23	9.594
Pct of County Hispanic 1990	4.962	4.973	23.14
Observations	821	399	308

Table A4: Household Characteristics by Race/Ethnicity

VARIABLES	White	Black	Hispanic
HH Net Worth (\$1000s)	221.3	74.96	92.90
Avg Years of Parents Schooling	13.25	12.29	11.29
Parent Ever in Jail (pct)	3.34	10.6	5.91
Mom's Age at First Birth	23.72	21.14	22.18
Parent Serve in Military	29.2	25.2	21.6
FAMILY SHOCKS	1.531	2.049	1.588
VICTIM SHOCKS	0.664	0.987	0.808
Female	0.515	0.560	0.520
Observations	821	399	308