Published in final edited form as:

Infant Ment Health J. 2019 January ; 40(1): 141–151. doi:10.1002/imhj.21759.

Early Childhood Education and Crime¹

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Abstract

This paper presents new evidence on the crime-reducing impacts of a high-quality, intensive early childhood program with long-term follow-up which was evaluated by an RCT. Proportionately more women than men decrease their criminal participation as a consequence of participating in the program. This gender difference arises because of the worse home environments for girls with corresponding greater scope for improvement by the program. For both genders, treatment effects are larger in magnitude for the least advantaged children, as measured by their mother's education at baseline. The dollar value of the social cost of criminal activity averted is higher for men because they commit more costly violent crimes.

Keywords

Crime; male violence; violent crimes; early childhood education; randomized trials; substitution bias

Introduction

Crime and the criminal justice system impose substantial costs on society (D. A. Anderson, 1999, 2012). This paper investigates whether an influential and widely emulated early childhood education program reduced involvement in crime. The program reduces

¹The authors thank the editors and other participants of the special issue on the early-in-life origins of violent behavior in males of the *Infant Mental Health Journal*. An earlier version of this paper was presented at a conference for the special issue November 11, 2017. This research was supported in part by: the Buffett Early Childhood Fund; the Pritzker Children's Initiative; the Robert Wood Johnson Foundation's Policies for Action program; the Leonard D. Schaeffer Center for Health Policy and Economics; NIH grants NICHD R37HD065072 and NICHD R01HD054702; and the American Bar Foundation. The views expressed in this paper are solely those of the authors and do not necessarily represent those of the funders or the official views of the National Institutes of Health. The set of codes to replicate the computations in this paper are posted in a repository. Interested parties can request to download all the files. The address of the repository is <https://github.com/aziff/ECE-crime>. To replicate the results in this paper, contact any of the authors, who will put you in contact with the appropriate individuals to obtain access to restricted data.

involvement in crime for both males and females but more so for females, who have a lower baseline rate of crime participation. However, the dollar value of the social cost of criminal activity averted is higher for males because they commit the more costly violent crimes.

Early intervention builds the skill base for enhancing the productivity of later investment. Moffitt (1993, 2018) notes the early emergence of externalizing behavior that predicts participation in adult crime. One of the primary benefits of the Perry Preschool Program was reducing violent crime among boys (Heckman, Moon, Pinto, Savelyev, & Yavitz, 2010b). Early childhood education promotes self-control and reduces externalizing behaviors. These are important mediators for reducing involvement in criminal behavior (Blackwell & Piquero, 2005; Heckman, Pinto, & Savelyev, 2013).

Specifically, we analyze the impact of ABC/CARE,² an intensive early childhood program starting at eight weeks and continuing through age 5, on the criminal activity of participants. Even though women have a lower base rate of criminal participation, proportionately more women than men decrease their involvement with crime as a consequence of participating in the program. García, Heckman, and Ziff (2018) document gender differences in the treatment effects occur across many outcomes (e.g., cognitive and achievements scores, socio-emotional skills, education, employment). The source of these differential benefits by gender is the worse home environments for girls with greater scope for enhancement by the program. This paper expands on these findings. We document that for both genders treatment effects are stronger for the least advantaged children where advantage is measured by the mother's education at baseline.

We contribute to the literature on early childhood education and crime in two ways. First, we improve on previous studies, e.g., Clarke and Campbell (1998) and M. L. Anderson (2008), by using novel data on criminal activity that combines self-reported and administrative sources. Using these data, we document substantial gender differences. Second, we document within-gender heterogeneity in the treatment effects of crime. Although previous analyses highlight gender differences, e.g. Heckman, Moon, Pinto, Savelyev, and Yavitz (2010a), only García, Heckman, and Ziff (2018) explore the sources of this difference. We find that, for both genders, the least advantaged children benefit the most from the program in terms of their participation in crime.

The plan of the paper is as follows. Section 2 describes the ABC/CARE intervention and the data collected on it. Section 3 presents our empirical analysis. Section 4 interprets our findings. Section 5 concludes.

Analysis of Crime in ABC/CARE

We first describe the program studied. We then discuss the main features of the data collected.

²The Carolina Abecedarian Project and the Carolina Approach to Responsive Education.

The ABC/CARE Program: An Overview

We analyze data collected from subjects in the ABC/CARE program evaluated by randomized controlled trial. The data we analyze combines the Carolina Abecedarian Project (ABC) and the Carolina Approach to Responsive Education (CARE), two randomized controlled trials consecutively implemented by the Frank Porter Graham Center (FPG) at the University of North Carolina at Chapel Hill. The goal of ABC/CARE was to promote language and cognitive development. To this end, the center-based curriculum encouraged interactions between teachers and students (J. Sparling & Lewis, 1979, 1984). Programmatic components including small student-staff ratio and a focus on individual or small-group learning were meant to further develop language skills. In addition to the educational part of center-based care, children were offered nutritious meals and medical check-ups (Craig T. Ramey, Bryant, Sparling, & Wasik, 1985; C. T. Ramey et al., 1976; Craig T. Ramey, Sparling, & Ramey, 2012; J. J. Sparling, 1974; Wasik, Ramey, Bryant, & Sparling, 1990).

The program targeted children from disadvantaged families in Chapel Hill, North Carolina. The treatment group was enrolled at 8 weeks of age and received high-quality, center-based education through age 5. There were many teachers or aids per classroom (child-teacher ratios varied from 1:4 to 1:6 throughout the program). They were trained continuously throughout the program to ensure that the interactive curriculum was implemented to each of the subject children in a consistent manner. Unlike other infant care and preschools available in the area at the time, the ABC/CARE center-based care provided a nurturing environment to impart instruction that aimed to prepare children for school entrance socially as well as cognitively and academically (Burchinal, Lee, & Ramey, 1989).

We analyze this program because it has self-reported and administrative data on crime outcomes collected when the subjects are adults. While other randomized studies of programs have larger samples and multi-site designs, few programs currently have longitudinal data that facilitate analyzing how early childhood education causally reduces criminal activity (see Elango, García, Heckman, and Hojman (2016), for a discussion).

Study Description

The children who participated in both studies were born to highly disadvantaged families in the Chapel Hill area between 1972 and 1980. Pregnant women in their third trimester were administered a FPG-developed High Risk Index (HRI) in order to determine eligibility. Items on the HRI included the presence of the father and maternal IQ (Craig T. Ramey & Campbell, 1984; Craig T. Ramey & Smith, 1977). As a result of the eligibility requirements, the average mother was 20 years old and 74% of the fathers were absent. For most families, the subject child was the first born. Although race was not a determinant of eligibility, 94% of the sample was African American.

Children were enrolled in this center-based program at 8 weeks of age. The first stage of the program ended at age 5. The initial ABC sample consisted of 120 families. Due to attrition and non-response, the study sample was reduced to 114 subjects: 58 in the treatment group and 56 in the control group (Craig T. Ramey & Campbell, 1979). In CARE, the initial

sample had 65 families: 23 were randomized to a control group, 25 to a family education treatment group, and 17 to a center-based childcare treatment group that followed ABC protocols (Wasik et al., 1990).³ During preschool, 5 subjects attrited (3 in the treatment group, 1 in the family education group, and 1 in the control group). We address attrition and nonresponse using standard weighting methodologies discussed in detail in García, Heckman, Leaf, and Prados (2018).

There was an additional school-age intervention between ages 5 and 8 in which a home visitor tutored children in material relevant to their elementary school instruction and parents were given help with communicating with the school's teachers and administrators. In ABC, a second randomization was used to analyze this component of treatment. Campbell, Ramey, Pungello, Sparling, and Miller-Johnson (2002) and Campbell et al. (2014) find no significant treatment effects of the school-age intervention. We thus disregard this part of treatment and treat the intervention as ranging between ages 0 and 5—the total duration of the first stage of the program.

The richness of the longitudinal data collection makes ABC/CARE ideal for our study. Larger, multi-site randomized controlled trials, such as the Head Start Impact Study (HSIS) or the Infant Health and Development Program (IHDP), do not yet have the adult outcomes that we analyze. Without long-term outcomes to fully understand the subjects' adult outcomes, it is difficult to understand the importance in gains of specific, early-life skill measures. This is especially the case for crime, which is primarily committed during and after puberty (Moffitt, 1993). The other program that would allow for this type of analysis, the Perry Preschool Project, is analyzed with recently collected administrative crime data in Heckman and Karapakula (2018).

Data Collection

In ABC/CARE, data were collected frequently on the children throughout the duration of the program. Data were collected on cognitive and social-emotional skills and family characteristics. ABC/CARE follow-ups occurred at ages 12, 15 (only for ABC), 21, 30, and 34. In the adult data collections, measures of education, employment, health, criminal activity, and family structure were obtained. Administrative data on income, welfare participation, and criminal activity further bolster the self-reported survey data.

In this paper, we use the crime data, collected through both self-reports and administrative records. Administrative data on arrests and sentences are available at age 34 for subjects in ABC and CARE. At age 21 in ABC, we have data on the type of crime committed: violent, property, drug, or other. Self-reported data on offenses are collected at ages 21 and 34 for both ABC and CARE. The self-reported data can capture crimes committed outside of North Carolina or unreported crimes while the administrative data can fill in gaps from under-reporting in the self-reports using manual match.⁴

³There were no randomization compromises in CARE. The home visiting component was not found to have any effect. Tests of the validity of pooling the other CARE treatment group with the ABC treatment group support combining them into one treatment group (Campbell et al., 2014).

Table 1 summarizes the availability of data by gender and treatment group. Of the 143 observed individuals, 75 committed at least one crime. As summarized in Table 2, the average number of crimes is 11.7 for men and 1.2 for women. It is likely that the incarceration variable (number of days incarcerated) is underreported because in many cases subjects are reported to have been sentenced without a length of incarceration. The descriptive statistics here provide a lower bound and are helpful to give context to the crime trajectories of the subjects. Men are incarcerated for much longer time periods than women, which is consistent with more numerous and severe male criminal activity.

Empirical Analysis

We begin our empirical analysis by calculating standard treatment effects. Let C_T indicate the total number of crimes committed. Let C_V , C_P , C_D , C_O represent the number of violent, property, drug, and other crimes respectively. Because all of the families offered treatment took it up, randomization (denoted $R \in \{0, 1\}$) is tantamount to receipt of treatment. To estimate the conditional treatment effects, we calculate $E[C_k | R = 1, x] - E[C_k | R = 0, x]$ for $k \in \{T, V, P, D, O\}$ where x is mother's education at baseline.⁵ These results are reported in Figure 1. The effects are statistically significant (at the 10% level) and beneficial for females for all crime types except violent and other crimes. For males, the effects are not statistically significant at the 10% level for all crime types except drug after trimming the sample by dropping the men who commit the top 10% of crimes. We trim the male sample in both the treatment and control groups. In practice, this results in dropping 2–4 individuals depending on the outcome.

Across all groups, the distribution is highly skewed with the majority of subjects committing fewer than ten crimes. The large number of subjects who commit no crimes imply that a distribution with a point mass at zero, such as one in the Poisson family, fits these data. Because the standard deviation is larger than the mean across all groups and all types of crimes (see Table 2), the data are more dispersed than a Poisson distribution itself would imply in which both the first and second moments must equal a common value, denoted here as λ . To formally explore this, we use a likelihood ratio test to compare the fit of the Poisson and negative binomial regressions, which tests the null hypothesis that the dispersion parameter is 0. For men and women and all types of crime, we can reject this null hypothesis at the 0.001 level.⁶ We thus use a negative binomial or mixed-Poisson model (see, e.g., Feller (1943)).

Let h denote the dispersion for C_T . To control for disadvantage among the children, we condition on baseline maternal education, x . We thus write the conditional mean for a count variable, C_T , as a function of the dispersion and the mean:

⁴We combine the data by matching crimes between the different sources based on date (or year) and crime (or crime category). This was a manual match, but the steps to do so and the conventions followed are documented in the code to construct the dataset and are available upon request alongside access to the ABC/CARE data.

⁵In all of our estimations, we also use an indicator of belonging to either the ABC or CARE sample, as that adds precision to our estimates. See García, Heckman, and Ziff (2018) for an extensive discussion of treatment take-up and of the parameters identified by random assignment to this program.

⁶It is also the case that all of the negative binomial regressions perform well according to Pearson and deviance goodness-of-fit tests.

$$\mathbb{E}[C_T | x, R, \mathcal{E}] = h\lambda, \quad (1)$$

where $h = \exp(\epsilon)$ and is assumed to follow a gamma distribution with one parameter: $\Gamma(\theta, \theta)$. This results in a mean of 1 and a variance of $\frac{1}{\theta}$. The negative binomial cumulative distribution thus written

$$\begin{aligned} \Pr[C_T = c | X = x, R] &= \frac{\Gamma(\theta + c) r^\theta (1 - r)^c}{\Gamma(1 + c) \Gamma(\theta)}, \\ c &= 0, 1, \dots, \quad \theta > 0 \quad (2) \\ r &= \frac{\theta}{\theta + h'} \end{aligned}$$

where $\Gamma(q)$ is the gamma function with parameter q .

Estimating this model using maximum likelihood allows us to isolate the marginal effect of treatment arising in ABC/CARE ($R = 1$) relative to the control condition ($R = 0$) (Courieroux, Monfort, & Trognon, 1984). Figure 2 displays the marginal effects from this negative binomial regression with C as the dependent variable by maternal level of education. We estimate the model separately for men and women controlling for sample (ABC or CARE) and mother's education (years of education at baseline). We only conduct this analysis on the total count of crimes as dividing by crime type in this analysis results in thin support for inference and more vulnerability to measurement error.

As maternal education increases, the predicted number of crimes decreases across all groups. The difference between treatment and control is much more pronounced for females than it is for males and is more sensitive to maternal education. As maternal education increases, ABC/CARE has a smaller effect of female crimes. The treatment effect in the predicted number of crimes remains relatively stable across education levels. The parametric structure used to generate the predictions produces more precise treatment effects than those reported in Figure 1, especially for males. The effect sizes for males remain small in comparison to those for females. The top bars of Figure 2, which show the treatment effects on the predicted number of crimes for all subjects regardless of mother's education, are similar in magnitude to those in Figure 1.⁷

Discussion of the Empirical Results

Due to the data required to link early interventions with adolescent and adult criminal behavior, there are few studies examining the specific effect of early childhood education on crime. Of the available studies, ABC and the Perry Preschool Project (PPP) have been particularly informative.⁸ Unlike ABC, PPP was a part-time program between ages 3–4 and

⁷The functional form of the negative binomial, which specifically addresses dispersed processes with a large mass at zero, increases the precision rather than alters the effect size.

5. It took place in Ypsilanti, Michigan between 1958 and 1962 and also had a home visiting component (Weikart, 1964). Like ABC, PPP targeted children from disadvantaged families and implemented a center-based curriculum that focused on child-led learning.

PPP reduced the female arrest rate by 0.337 and lifetime arrests by 1.95. The analogous crime treatment effects in ABC are not statistically significant after adjusting for multiple hypothesis testing and small sample size (using exact permutation-based inference), but ABC did reduce female marijuana use by 31.7 percentage points (control mean: 0.357). The analyses of M. L. Anderson (2008) are based only on self-reported data up to age 21 and not administrative records or self-reported data collected when the ABC subjects were between 30 and 35 years old.⁹

The analysis in García, Heckman, and Ziff (2017) builds on Campbell et al. (2012) and reports a stronger effect for women than for men. García et al. (2017) use the same sample that we use in this paper. Table 3 reproduces their main results concerning crime. Across all of the crime outcomes that they consider,¹⁰ the average effect size is 0.242 for females and -0.093 for males. Only the average effect size for females is statistically significant at the 10%. For females, there is a positive treatment effect for all outcomes, while for males there is a positive treatment effect for only 33.3% of the outcomes. The authors develop an inferential procedure for the percentage of treatment effects that are positive and find that both percentages are statistically significant at the 10% level. Similarly, they report that 100% of the treatment effects are positive and statistically significant at the 10% level for females while 0% are statistically significant for males. Consistent with our analysis, the authors conclude that females benefit more from treatment than males for treatment effects that are not weighted by the cost to society of the crime averted.

When we consider the costs of crime for the perpetrators, victims, and society, even modest treatment effects can have important policy implications.¹¹ Table 4, based on García, Heckman, Leaf, et al. (2018), provides the estimates of the cost-benefit analyses of ABC/CARE and PPP using the most recently collected data. The analysis expands the estimated benefits from reduced crime by accounting for victimization costs of unreported crimes and projecting crimes that will be committed up to age 50.

Weighting the treatment effects on crime by the costs of the crimes accounts for the severity of the crime averted and reveals a different pattern than the treatment effects on the quantity of crime. Although ABC/CARE reduced the incidence of crime more for women than for men, the benefit in reducing the males crimes (\$466,318 USD 2017) is much larger than the benefit in reducing the females' crimes (\$32,790 USD 2017). These numbers are calculated

⁸In addition to ABC/CARE and PPP, the Chicago Longitudinal Study of Chicago Child-Parent Centers (CPC) also collects longitudinal data on criminal activity. The CPC intervention involved part-time preschool for low-income children born in 1980. Relative to a comparable group of children who did not attend CPC, Reynolds, Temple, Robertson, and Mann (2001) find a reduction in the number of arrests at age 20. However, enrollment in CPC was not randomized making these results difficult to interpret and compare to the results of ABC or PPP. They also do not report effects separately by gender.

⁹Campbell et al. (2012) first analyzed these self-reported crime data, but found no significant treatment effects. However, they did not estimate separate treatment effects by gender and did not use the administrative data.

¹⁰The outcomes are felonies and misdemeanors at age 34 in administrative criminal records and self-reported total amount of time incarcerated.

¹¹Barnett and Masse (2007) present a cost-benefit analysis of ABC through age 21, but do not include the benefits of reduced crime found after the age-21 data collection.

by weighting the crimes averted by their social cost. Men commit more costly crimes, with a large proportion of the male estimates coming from the victimization crimes from violent crimes. This pattern of men committing more violent and costly crimes than women is also found in national statistics (Carson, 2018).

The cost-benefit analyses of ABC/CARE and PPP also include the costs of incarceration and other criminal justice components, which are not accounted for in standard reports of treatment effects. Punishment for one crime can reduce the number of future crimes committed through the effect of incapacitation (Ehrlich, 1981). Although we do not present causal estimators of this effect, our analysis suggests that ABC/CARE reduced the crime rate outside of incarceration for females in the teenage years, while treatment-group males committed more crimes during this period.

The cost-benefit analysis of PPP gives similar results with the reduced crime for men resulting in larger monetary benefits than the reduced crimes for women (Heckman et al., 2010b). Similar to the cost-benefit analysis of ABC/CARE, the PPP analysis includes adjustment for unreported crimes and predicts criminal activity beyond age 40, which was the last point of data collection at the time of the analysis. The largest difference between the two studies is that the PPP study does not account for the statistical value of life lost from murder or manslaughter. As a result, the benefits for men (\$136,479 USD 2017), are lower in the PPP study than those estimated in ABC/CARE. The estimated benefits are also lower for women in PPP than in ABC/CARE (\$27,435 USD 2017).

In summary, the treatment effects on the average number of arrests are larger for women than for men. However, the social cost of the average male arrest outweighs that of the average female arrest. *This underscores the importance of interpreting the treatment effects of early childhood education in the life-cycle context by gender and the importance of considering crimes individually rather than focusing solely on averages.*

Explaining the Results

The pattern of gendered effects that we observe could be driven by many factors including biological, psychological, environmental, economic, or social components and the many possible interactions of these factors over the lifetime.

During pregnancy, the release of hormones, for example testosterone, affects the development of the fetal brain in different ways depending on sex. This is one mechanism that drives potential innate differences between boys and girls (Schore, 2017; Zahn-Waxler, Shirtcliff, & Marceau, 2008). Although there have been many suggestive findings concerning the presence of biological gender differences, only a few differences, such as females developing more robustly earlier (Eliot, 2010), have been resolutely proven to be innate, although the consequences of these types of differences can be influenced by external factors after birth. Because of the brain's plasticity, the comparison of male and female brains in childhood and beyond might more accurately capture the interplay between the child and the environment rather than any innate gender differences (Eliot, 2011). A recurring finding has been that males are more vulnerable during the prenatal and perinatal stage due to the rate of gestation and the larger size of male fetuses. This increased

vulnerability interacted with harmful environmental factors can result in the marked differences observed between genders during childhood, adolescence, and adulthood (Beeghly et al., 2017; Jaffee, 2009; Marwha, Halari, & Eliot, 2017; Tan, Ma, Vira, Marwha, & Eliot, 2016).

It is also possible that the way parents invest in their children is affected by sex of the child. In addition to investments changing during pregnancy depending on the sex of the baby, investments can change after birth. Lundberg (2005) finds that fathers are more likely to be involved in a son's life. In resource-constrained settings, this "son preference" can be driven by male outcomes being more beneficial for a family relative to female outcomes. Dahl and Moretti (2008) document evidence of a preference for sons in the US based on the fertility, marriage, and custody decisions for families with different compositions of gender of the children.

García, Heckman, and Ziff (2018) find that gender differences at birth are also an essential factor to consider when interpreting the treatment effects of ABC/CARE. The authors document that, at baseline, there is a significant difference between boys and girls in an index that contains mother's age, education, IQ, marital status, and employment, as well as the number of siblings and father's presence at home. This fact leads to a better environment for boys so that the program that we study has a greater scope for improving girls' lives.

Apart from parental inputs, it is possible that other investments, such as early childhood education, have certain components that affect boys and girls differently. Magnuson et al. (2016) provide a discussion of some of the components of center-based education that could differently affect boys and girls. For example, Holmlund and Sund (2008) report that teachers respond more positively to children of the same sex. The sex of the teacher alone could change what a child gets out of a center-based experience. In ABC/CARE, the caregivers were predominantly females.

Finally, it is possible that there are gender differences in the social contexts of these outcomes. The children's skills imply outcomes of interest that could have social factors influencing the subsequent skill formation differently for males and females. For example, even though higher social-emotional skills might be associated with less involvement in criminal activity, social expectations about masculinity can play a role in decisions regarding risky behaviors (Courtenay, McCreary, & Merighi, 2002). Another example could be expulsion in preschool and elementary school. There is evidence that boys, especially those from disadvantaged backgrounds, are more likely to be expelled than girls. This can have consequences for future skill formation (Gilliam, Maupin, Reyes, Accavitti, & Shic, 2016; Ponitz, Rimm-Kaufman, Brock, & Nathanson, 2009).

Summary

This paper demonstrates sharp gender differences in responses to early childhood education in terms of crime averted for disadvantaged boys and girls. Treatment effects are more often statistically significant for girls than boys at conventional levels. While the program benefits females more regarding the number of criminal outcomes with positive treatment effects and

positive and significant treatment effects, the dollar values of crimes averted for men are much higher. Our results are consistent with García, Heckman, and Ziff (2018), who report that, at baseline, girls are at a greater socioeconomic disadvantage so that the program has greater scope for improving girls' lives. The program is most effective for the most disadvantaged children of both genders.

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Figure 1: Treatment Effects

Note: This figure shows the treatment effects separately for men and women across crime categories. Due to extreme outliers in the male group, we trim the top 10% of the males (in both the treatment and control groups). The reported control means are the empirical counterparts to Equation (1) when setting R to 0. Treatment effects are the empirical counterpart to $\mathbb{E}[C_k | R = 1, X = x] - \mathbb{E}[C_k | R = 0, X = x]$ for crime categories $k \in \{T, V, P, D, O\}$. We report asymptotic p -values.

Figure 2: Predicted Number of Crimes by Maternal Education

Note: This figure shows the predicted number of crimes separately for men and women for the total number of crimes by mothers' education, as given by Equation (1). Due to extreme outliers in the male group, we trim the top 10% of the males (in both the treatment and control groups). We bin mother's years of education at baseline (y -axis) by less than or equal to 9, between 9 and 12, or at least 12. The reported control means are the empirical counterparts to Equation (1) when setting R to 0. Treatment effects are the empirical counterpart to $\mathbb{E}[C_T | R = 1, X = x] - \mathbb{E}[C_T | R = 0, X = x]$ for the total number of crimes C_T . We report asymptotic p -values.

Table 1:

Number of Individuals in the Crime Data

	Criminal Activity?					
	No			Yes		
	Male	Female	Total	Male	Female	Total
Control	16	20	36	21	17	38
Treatment	11	21	32	26	11	37
			68			75

Note: This table lists the number of ABC/CARE subjects in the crime data. 12 subjects were excluded from the study due to death or having moved from the Chapel Hill area (6 controls: 2 males, 4 females; 6 treatment: 1 male, 5 females). These individuals were no longer part of the study at the age-21, -30, or -34 data collections. We searched the remaining 143 individuals in criminal records or relied on self-reported criminal history. Of these, 75 had committed at least one crime.

Table 2:

Summary of Crime Variables

	Control		Treatment	
	Male	Female	Male	Female
Property	2.486 (5.581)	1.351 (3.953)	3.243 (7.466)	0.281 (0.683)
Drug	2.757 (4.879)	0.973 (2.455)	1.784 (3.473)	0.250 (0.762)
Violent	2.378 (4.518)	0.324 (0.915)	2.324 (3.432)	0.219 (0.608)
Other	4.811 (10.82)	2.514 (9.066)	4.297 (8.794)	0.438 (0.914)
Total	12.43 (21.58)	5.162 (15.01)	11.65 (17.83)	1.188 (2.306)
Incarceration [days]	363.2 (926.6)	58.89 (246.9)	447.7 (1073.7)	1.562 (8.839)

Note: This table summarizes the mean (standard deviation) number of crimes by treatment status and gender. This is calculated by summarizing the number of crimes committed by the 143 individuals who were still considered part of the study at the points of crime data collection. These calculations include those who did not commit any crimes. The incarceration row indicates the mean (standard deviation) number of days incarcerated including 0 for those who were not incarcerated.

Table 3:

ABC/CARE Treatment Effect Aggregates by Gender

	Average Effect Size	% > 0 Treatment Effect	% > 0, Significant Treatment Effect
Females	0.242	100.000	100.000
Males	-0.093	33.333	0.000

Source: Reproduced from García et al. (2018)(a).

Note: This table displays summaries of treatment effects by outcome category and gender. Each of the panels contains statistics calculated using outcomes grouped by category. The average effect size is calculated by averaging over the effect size of the outcomes in the outcome category. The effect sizes of the individual outcomes are calculated by dividing the treatment-control mean difference by the standard deviation of the control group. The table presents bootstrapped *p*-values. For the proportion of outcomes that are positive and significant, the table displays a “double bootstrap” procedure. The null hypothesis for the average effect sizes is that they are 0. The null hypothesis for the proportion of outcomes that are (significantly) positive is that they are (10%) 50%. Bolded statistics are significant at the 10% level.

Table 4:

Summary of Cost

Program	Statistic	Females	Males	Pooled
ABC/CARE	NPV	167,488	951,597	659,221
ABC/CARE	B/C	2.61 (0.73)	10.19 (2.93)	7.33 (1.84)
ABC/CARE	NPV without crime	32,790	661,550	466,318
ABC/CARE	B/C without crime	2.34 (0.62)	4.08 (2.18)	3.06 (1.01)
PPP	B/C high murder cost	4.5 (1.4)	8.6 (3.7)	7.1 (2.3)
PPP	B/C low murder cost	11.6 (7.1)	12.1 (8.0)	12.2 (5.3)
PPP	B/C without crime	3.3 (1.4)	4.9 (1.4)	4.2 (1.1)

Note: This table compiles estimates from García, Heckman, Leaf, and Prados (2016) (ABC/CARE) and Heckman, Moon, Pinto, Savelyev, and Yavitz (2010) (PPP). The net present values (NPV) are only reported for ABC/CARE and do not include standard errors. All NPV values are in 2017 USD. The benefit-cost ratios (B/C) are bolded for ABC/CARE when statistically significant at the 10% level. Bootstrapped standard errors are reported in parentheses. In the ABC/CARE estimates, the total cost of murder was estimated to be 9,286,200 (2014 USD). In Heckman et al. (2010), estimates are calculated for a high murder cost (approximately 4,500,000 2014 USD) and a low murder cost (approximately 14,000 2014 USD).