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Education and Crime Prevention: Impacts, Mechanisms, and Policy Implications for Latin America and the Caribbean*

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Abstract

Drawing on evidence from a broad range of policies and interventions—including compulsory schooling reforms, improvements in school quality, early childhood education, extended school days, extracurricular programs, summer employment programs, and conditional cash transfers—this paper systematically reviews the causal evidence on the relationship between education and crime to inform policy design in Latin America and the Caribbean. The review covers 81 studies and organizes the evidence into nine categories of educational policies and programs. It compares effects across crime outcomes, examines the mechanisms through which the interventions operate, and, when possible, summarizes their costs and cost-effectiveness. Overall, educational interventions tend to reduce criminal involvement, although their effectiveness varies substantially across policies and outcomes. The literature points to multiple mechanisms beyond the traditional channels of higher opportunity costs of crime and incapacitation, including socio-emotional skill development, peer effects, and household dynamics. However, relatively few studies examine the economic returns to educational interventions or incorporate crime-reduction benefits into cost–benefit analyses, which may lead to an underestimation of their social value. Finally, the evidence base is heavily concentrated in the United States, highlighting the need for more rigorous research in underrepresented regions and greater attention to contextual factors that may influence policy effectiveness. The paper concludes with policy recommendations for the region, emphasizing implementation conditions, targeting criteria, and priorities for future research.

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1. Introduction

Crime and violence impose substantial economic and social costs worldwide, reducing productivity, eroding human capital, and diverting scarce resources from development toward security and criminal justice spending (Institute for Economics and Peace 2025). These burdens are particularly severe in Latin America and the Caribbean, where high levels of violence interact with persistent socio-economic inequalities that constrain economic growth, social mobility, and citizens' well-being. The regional homicide rate reached 20 per 100,000 inhabitants in 2022, more than three times the global average (UNODC 2024). That same year, the direct costs of crime—including household spending on private security, government spending on policing, courts, and prisons, and human capital lost to deaths, injuries, and incarceration—amounted to 3.44% of regional gross domestic product (GDP). To put this figure in perspective, it was equivalent to 78% of public education spending, twice the region's total social assistance expenditure, and 12 times its investment in research and development (Perez-Vincent *et al*. 2024).

The magnitude of these costs has intensified interest in the determinants of criminal behavior and in policies that can prevent it. Within this research agenda, the relationship between education and crime is central. Since Becker's (1968) seminal contribution, economists have emphasized that education may reduce the propensity to engage in crime by improving legitimate employment opportunities and thereby raising the opportunity cost of criminal activity. Accumulated evidence, however, indicates that labor-market returns explain only part of this relationship. Educational institutions and school-based interventions may also affect criminal behavior through incapacitation, by increasing supervision and limiting unstructured time; the development of socio-emotional skills, including self-regulation and impulse control; exposure to peers and school environments that may reinforce or discourage antisocial behavior; and changes in household formation, parenting practices, and the trajectories of subsequent generations. These mechanisms may interact, making the education–crime relationship complex, multidimensional, and dependent on institutional context, program design, and the outcome under consideration. Causality may also run in the opposite direction: crime can impair learning, weaken attachment to school, increase dropout, and disrupt human capital accumulation.[1]

Despite a growing body of rigorous research, the evidence remains fragmented across interventions, outcomes, and disciplinary traditions. It is also drawn predominantly from high-income countries. Important questions therefore remain about which educational policies are most effective at reducing different types of crime, the mechanisms through which they operate, their cost-effectiveness, and the extent to which findings from other contexts can be transferred to the institutional and socio-economic realities of Latin America and the Caribbean.

This paper addresses these questions through a structured, policy-oriented comparison of evidence on the education–crime relationship. Building on recent reviews, including Bagby *et al*. (2021) and Machin and Sandi (2024), it makes three additional contributions. First, the paper assesses not only whether an intervention reduces crime but also how consistent the evidence is across studies and outcomes, comparing both the direction and magnitude of estimated effects. Second, it systematizes the mechanisms through which educational interventions may influence crime. Third, it evaluates the relevance of the evidence for policy design in Latin America and the Caribbean,

[1] For example, studies have shown that juvenile incarceration can undermine subsequent educational and employment trajectories (Hjalmarsson 2008; Aizer and Doyle 2015); that violence and crime can impair learning outcomes (Michaelsen and Salardi 2020; Koppensteiner and Menezes 2021); and that exposure to disruptive peers and school bullying can negatively affect individuals' human capital accumulation (Carrell and Hoekstra 2010; Padilla-Romo and Peluffo 2025; Sarzosa 2024).

including available information on program costs and social returns. The resulting recommendations explicitly account for the limitations of an evidence base drawn primarily from high-income countries and are adapted to the region's realities, constraints, and institutional context. The review summarizes 81 studies selected from an initial pool of 496. Studies were included if they used a credible causal identification strategy to estimate the effect of an educational policy or intervention on at least one of four outcomes: incarceration, violent crime, non-violent crime, or school crime. Violent crime encompasses various forms of physical assault, with or without weapons. Non-violent crime consists primarily of property and drug-related offenses. School crime refers to arrests or offenses occurring on school premises and excludes suspensions and bullying.

The studies are grouped into nine categories according to the available causal evidence: changes in years of schooling; changes in time spent in school; access to higher-quality education and improved learning; early childhood education; school-entry age; extracurricular programs with behavioral components; school sanctions for poor performance or misconduct; school-vacation employment programs; and economic incentives tied to educational participation or outcomes, such as conditional cash transfers (CCTs). The classification distinguishes policies that operate at different stages of the educational experience, from early childhood through higher education, and along dimensions such as institutional quality, exposure time, peer interactions, socio-emotional skill development, and family trajectories. This distinction is important because the interventions neither operate through the same channels nor affect all types of crime equally. Within each category, the review organizes the mechanisms proposed in the literature into three direct channels—human capital accumulation, distinguishing educational quantity from learning quality; incapacitation; and socio-emotional skill development—and two cross-cutting channels involving peer effects and household dynamics, which may amplify or attenuate an intervention's direct effects.

A formal meta-analysis is not well suited to the primary objective of this review. The available studies do not generally estimate a common underlying treatment or estimand but instead examine substantially different educational interventions, treatment margins, populations, outcomes, time horizons, and institutional settings. Although meta-analytic methods can accommodate statistical heterogeneity in effect sizes, they do not resolve the more fundamental comparability problem that arises when pooling estimates of economically distinct treatments operating through different mechanisms. This is particularly relevant because most of the interventions reviewed were designed to achieve educational objectives rather than to reduce crime directly, and their effects on criminal behavior operate through different channels. Pooling these estimates into a single effect size could therefore obscure precisely the heterogeneity that is most relevant to this study and its policy recommendations. As the evidence base expands, a larger set of studies examining sufficiently comparable interventions, outcomes, and populations may make a formal meta-analysis both feasible and informative.

The review yields four main findings. First, causal research on the effects of education on crime has concentrated primarily on two outcomes: violent and non-violent crime. Of the 81 studies included in the review, 84% investigate effects on violent crime and 83% on non-violent crime. In contrast, only 32% consider incarceration, and just 22% examine crime occurring in schools.

Second, the evidence generally indicates that educational interventions reduce criminal involvement, although the consistency of these effects varies across outcomes and policy categories. Among studies examining each outcome, 76% report reductions in non-violent crime, 69% in violent crime, 81% in incarceration, and 67% in school crime. The findings for incarceration and school crime, however, are based on substantially smaller bodies of evidence. Interventions that

improve educational quality, early childhood programs, programs with behavioral components, and policies that increase educational attainment produce the most consistently favorable effects. In contrast, policies that alter the amount of time spent in school generate mixed effects on violent crime, while school sanctions show no consistent crime-reduction benefits and may increase subsequent incarceration.

Third, the mechanisms proposed in the literature extend well beyond labor-market returns. Socio-emotional development and incapacitation are identified as potential channels about as often as, or more often than, human capital accumulation and improved employment opportunities. Notably, improvements in learning are identified as a mechanism in only 14% of studies, the same proportion that identifies intergenerational channels, despite the central role of learning in education policy. The relative importance of the proposed mechanisms also varies across interventions. Peer interactions and the concentration of young people, for example, are particularly relevant to policies that alter the amount of time students spend in school. Because most studies do not directly test or quantify the contribution of individual mechanisms, however, this evidence should be interpreted as suggestive rather than conclusive.

Fourth, the review identifies several important gaps that define priorities for future research. Evidence on costs and social returns remains limited, making it difficult to compare the efficiency of alternative interventions. Approximately two-thirds of the studies conduct no economic analysis, and only 19% estimate a rate of return or benefit–cost ratio. Where such evidence exists, however, it underscores the importance of accounting for benefits beyond conventional educational outcomes. In several influential evaluations of early childhood programs, reductions in crime constitute a major component of estimated social returns. The literature is also geographically concentrated, with more than two-thirds of the studies conducted in the United States, while fewer than one-fifth were conducted in Latin America and the Caribbean. This imbalance raises important questions about the external validity and applicability of the findings to the region. It also underscores the value of a review that explicitly acknowledges this limitation and assesses the relevance of the evidence in light of the region's institutional, socio-economic, and educational characteristics. In addition, several prominent educational interventions, including investments in school infrastructure, school meals, and teacher capacity, have demonstrated positive effects on educational outcomes but have not been evaluated with respect to crime and were therefore excluded from the review.

The remainder of the paper proceeds as follows. Subsequent sections review the evidence by policy or program, summarizing each study's design, data sources, empirical strategy, and main findings. A comparative synthesis then examines the evidence on impacts by crime type, proposed mechanisms, available cost and cost–benefit evidence, and the geographic distribution of studies. The paper concludes with policy implications and recommendations specifically adapted to Latin America and the Caribbean, highlighting implementation conditions, targeting criteria, and priority research gaps to inform future policy formulation.

2. The Causal Impact of Education on Crime

This section presents the main findings for each of the nine categories of educational policies reviewed. Although each category is examined separately, an aggregate view reveals several general patterns in the relationship between education and crime. As shown in Panel A of Table 1, the literature focuses primarily on two outcomes: violent and non-violent crime. Of the 81 studies included, 84% examine violent crime and 83% examine non-violent crime. In contrast, only 32%

consider incarceration, and just 22% examine crime occurring in schools. Overall, the evidence indicates that educational interventions reduce criminal involvement, although the consistency of these effects varies across outcomes and policy categories. Across all studies, 63% report significant reductions in non-violent crime, and 58% report reductions in violent crime.

Some educational interventions are associated with increases in criminal activity, but such findings are relatively uncommon: only 7% of studies report increases in non-violent crime, and 11% report increases in violent crime. When the denominator is restricted to studies that examine each outcome (Panel B of Table 1), 76% report reductions in non-violent crime, 69% report reductions in violent crime, and 81% report reductions in incarceration.

Evidence on incarceration and school-related crime is considerably more limited. Across the full sample, 26% of studies report reductions in incarceration, and 15% report reductions in school-related crime; increases and statistically insignificant effects are relatively uncommon for these outcomes.

2.1. More Years of Education: Policies That Modify the Number of Years of Schooling

Studies examining how years of schooling affect the likelihood of engaging in criminal activity constitute the most traditional strand of this literature. Most of these studies exploit exogenous variation generated by changes in compulsory schooling laws, often referred to in the literature as the minimum school-leaving age (MSLA) or the minimum legal school dropout age (MDA). The review also includes studies that provide complementary evidence on this relationship, drawing on school construction expansions, twin comparisons, and dynamic models. In total, the review identified 17 studies from the United Kingdom, the United States, Sweden, Italy, Denmark, Finland, Australia, Mexico, and Brazil that exploit these sources of variation. These studies use instrumental variables (IV), difference-in-differences (DiD), or regression discontinuity (RD) methods to compare involvement in criminal activities or violent incidents between cohorts affected and unaffected by the reforms, both within and outside the school environment.

Overall, the evidence consistently shows that additional years of education reduce the likelihood of incarceration and, most notably, the probability of committing non-violent crimes, particularly property offenses. As summarized in Table 1, 35% of the studies reviewed find reductions in incarceration, 76% find reductions in non-violent crime, and 65% report reductions in violent crime. At the same time, this is one of the areas where a potential trade-off emerges most clearly, as 12% of the studies report increases in school-related crime, and 6% report increases in violent crime.

The seminal study by Lochner and Moretti (2004) examines the long-term impacts of education on crime in the United States. It was among the first studies in the literature to identify this causal effect using variation in state compulsory schooling laws between 1914 and 1974 as an instrument. Using census data, the authors find that one additional year of education reduces the probability of incarceration by 0.10 percentage points for Whites and 0.37 percentage points for Blacks. Using Federal Bureau of Investigation (FBI) data, they find that one additional year of education reduces arrests for violent and property crimes by approximately 11%–12%. Their results indicate that education accounts for approximately 23% of the incarceration gap between Whites and Blacks. The authors argue that the main mechanism is the increase in the opportunity cost of crime, as higher levels of education raise expected earnings. They also note that education could influence

preferences and peer interactions, thereby reducing future crime. Finally, although they do not conduct a cost–benefit analysis, they monetize the estimated impacts of increased education on crime using a crime-specific accounting approach. Using this approach, they estimate that a 1-percentage-point increase in the male secondary school graduation rate would generate savings of approximately US$1,170–US$2,100 per additional graduate. According to their calculations, the externalities associated with avoided crime amount to 14%–26% of the private return to completing secondary school (i.e., the social benefit from crime reduction is substantial relative to the private wage benefit).

Subsequent studies confirm these results for the United States in other periods, extend them to other countries, and explore additional mechanisms, such as incapacitation and the marriage market. Machin *et al.* (2011), for example, evaluate the increase in the MSLA from 15 to 16 in England and Wales in 1972. Their causal estimates show that the reform reduced property crime by 26%–30%, effects considerably larger than those observed in the United States. Their cost–benefit analysis indicates that the policy generated negative net returns in the early years, but these turned positive around the fifth year, driven by social savings associated with increased education, including crime reduction. Again, the main mechanism identified is the increase in labor earnings, although the role of preferences and peers is not ruled out.

Anderson (2014) complements this literature by estimating the contemporaneous impact of raising the MDA on juvenile crime in the United States, exploiting variation in the timing of the reform's adoption across states. Using a DiD design, he finds that increasing the MDA to 18 significantly reduces arrests among youth aged 16–18 compared with states where the MDA remained at 17. In particular, the reform reduced arrests among males for property crimes (9.9%) and violent crimes (22.5%), with no robust effects on drug-related offenses. Effects are larger in counties with a higher proportion of African Americans, consistent with greater impacts in vulnerable socio-economic contexts. No significant effects are found for females. The author identifies incapacitation as the main mechanism, as longer school attendance reduces the time available to engage in crime. In cost–benefit terms, he estimates that if all states set the MDA at 18, annual savings from reduced property crime would amount to approximately US$190 million in 2008 prices.

Gilpin and Pennig (2015), building on Anderson's (2014) hypothesis, analyze whether raising the MDA above 16 increases crime in schools. Unlike previous studies that used police data or self-reported surveys, this study uses the School Survey on Crime and Safety (SSOCS), a survey of school principals that captures incidents occurring in the school environment, including those not always reported to the police. The sample combines four survey rounds and exploits 13 state reforms implemented between 2000 and 2010 that increased the MDA. Identification is based on a DiD design that exploits variation across states and over time. The results indicate that raising the MDA to 18 increases total school crime by 18.5%, equivalent to approximately 10 additional incidents per school per year, while raising it to 17 produces no robust changes. The increase is driven primarily by unarmed physical assaults, which account for 7 of the 10.4 additional offenses, with no clear changes in drug-related or property offenses and a small reduction in serious violent offenses. The authors interpret these findings as evidence consistent with the concentration of higher-risk youth within schools resulting from compulsory attendance. Although the study does not directly estimate effects on crime outside schools or present a cost–benefit analysis, the authors conclude that the social benefits associated with increases in the MDA remain substantial, even if these reforms may increase crime within schools.

Hjalmarsson *et al.* (2015) estimate the causal effect of a Swedish reform that extended compulsory schooling from 7 to 9 years and was implemented gradually across municipalities during the 1950s and 1960s. They use administrative microdata for more than 400,000 individuals born between 1943 and 1954, linking educational data with official records of convictions and sentences observed between 1973 and 2007. Their identification strategy exploits variation in exposure to the reform by municipality and cohort, combining DiD and IV approaches in which exposure to the reform serves as an instrument for years of schooling. In the first stage, they find that the reform increased average schooling by 0.33 years for men and 0.20 years for women. Effects on crime are significant only for men. Their estimates suggest that one additional year of schooling reduces the probability of having at least one conviction by 2.2 percentage points, equivalent to a decline of approximately 6.7%, and the probability of receiving a prison sentence by 1.1 percentage points, representing a 15.5% reduction. When disaggregated by crime type, the effect is concentrated in property crime, which falls by 14%. In contrast, although the coefficients for the number of convictions and days sentenced to prison are negative, they are not statistically significant, suggesting that education mainly affects the incidence of crime (conviction or imprisonment) rather than its intensity. Although they do not conduct a formal analysis of mechanisms, the authors argue that, because effects are observed primarily in adulthood rather than only during the period of compulsory schooling, the most plausible channel operates through human capital accumulation, higher labor-market returns, and a greater opportunity cost of crime. The study does not present a cost–benefit analysis.

Bell *et al.* (2016) reexamine the United States, arguing that the conclusions of Lochner and Moretti (2004) may not generalize to more recent cohorts. They also note that Anderson (2014) focuses on the contemporaneous effect of these laws on crime, primarily capturing the incapacitation channel rather than their effect on human capital accumulation. Using MDA reforms implemented between 1980 and 2010, the authors find that their effect on years of schooling is weak in the general population but stronger among African Americans. In reduced-form models, raising the MDA from 17 to 18 is associated with reductions of 12.6% in property crime arrests and 4.9% in violent crime arrests. Among African Americans, for whom the first-stage relationship is stronger, reductions reach 19.5% in property crime arrests and 45.6% in violent crime arrests. Using census microdata, the authors report an average reduction in incarceration of 0.27 percentage points, with reductions of 0.09 percentage points for Whites and 1.18 percentage points for Blacks. Although incapacitation explains part of these results, effects observed at older ages suggest additional mechanisms beyond keeping youth in school. The authors do not conduct a cost–benefit analysis. They conclude that the relatively limited effect of compulsory schooling laws on human capital accumulation underscores the need to continue exploring other channels that explain criminal involvement.

Brilli and Tonello (2018) analyze the 1999 Italian reform that extended compulsory schooling from 8 to 9 years, requiring youth who completed lower secondary education, at approximately age 14, to enroll in and attend at least the first year of upper secondary school. The authors estimate contemporaneous effects on adolescent crime by combining administrative enrollment records and police reports in a DiD design that compares cohorts and age groups exposed to the reform with an unaffected group of 17-year-olds. The first stage shows that the reform increased upper secondary enrollment by approximately 4 percentage points among treated groups, confirming that it raised school attendance at the targeted ages. Although the average effect on crime for the 14–16 age group is not statistically significant, the reduction is concentrated among 14-year-olds, the group directly affected by the reform. Estimates suggest a decline of approximately 11.5% in the offense rate relative to its mean. Moreover, the authors find no robust evidence of temporal displacement toward school vacations or periods outside school hours. In fact, they report reductions in certain offenses, such as drug-related offenses, during non-school periods. However, they document an increase in

victimization and violence within schools, consistent with student concentration effects and previous evidence. Overall, the authors conclude that the results are consistent with incapacitation as the dominant mechanism but emphasize the need for complementary policies, such as improved infrastructure, staffing, and behavior management, to mitigate the potential costs arising from greater concentrations of youth in the school environment.

Beatton *et al*. (2018) evaluate the impact of the Earning or Learning reform implemented in Queensland, Australia, in 2006, which required youth turning 16 or completing tenth grade to remain in education for up to two additional years, enter vocational training, or obtain employment of more than 25 hours per week. Using administrative data on education and crime, the authors combine before-and-after reduced-form estimates with a cohort discontinuity design around the reform. They find that the reform increased school retention, reduced adolescent employment, and decreased juvenile crime. In education, they estimate a 2-percentage-point increase in retention in grades 11–12, with larger effects for males. In terms of crime, they observe a significant reduction in the annual probability of committing a police-recorded offense. In the discontinuity design, the probability of committing any offense falls by approximately 0.4 percentage points from a baseline mean of 3.93%, equivalent to a 10% reduction. Effects are larger for males (10.8%) than for females (8.9%). By crime type, males show significant reductions in violent offenses (0.122 percentage points), property offenses (0.323 percentage points), and drug offenses (0.398 percentage points). For females, the effect is limited to property offenses (0.102 percentage points). The age patterns and analyses of the margins of criminal involvement suggest that incapacitation is an important mechanism, operating primarily through the extensive margin (i.e., reducing entry into crime rather than its intensity among persistent offenders). The study does not present a cost–benefit analysis.

Cano-Urbina and Lochner (2019) estimate the effects of schooling and educational quality on female crime in the United States. They use compulsory schooling laws as instruments for years of schooling, linking them to census and FBI arrest data. They also incorporate historical measures of educational quality, such as student–teacher ratios, school year length, and teacher salaries. Using census data from 1960 to 1980, they find that one additional year of schooling reduces the probability of incarceration by 0.04–0.08 percentage points among White and Black women. They also document substantial reductions in arrests for violent and property crimes, with no effects on white-collar offenses. Unlike in other studies, these effects are not associated with increased female labor force participation or wages but rather with marital or family-related mechanisms. Exposure to the reforms increases the probability of being married by 7.5 percentage points, the probability of having a spouse with a high school diploma by 16.6 percentage points, and household income by approximately US$6,500, suggesting that the main mechanism is family-related.

Bell *et al*. (2022) extend their earlier 2016 study, which replicated the approach of Lochner and Moretti (2004), by incorporating more recent data and different measures of crime. Their main objective is to identify the mechanisms underlying crime reduction. Their estimates show that one additional year of schooling reduces the conviction rate by 6% for non-violent offenses and 10% for serious crimes. Specifically, raising the MDA reduces the total arrest rate by approximately 6%. Effects are larger among youth directly required to remain in school, with a 6.9% reduction in arrests among males aged 15–18, although significant reductions of approximately 4% are also observed among males aged 19–24. By crime type, reductions are 5.2% for violent offenses, 5.3% for property offenses, and 10.1% for drug offenses, with particularly large effects for the latter among school-age youth.

The central contribution of the study is its distinction between the different mechanisms underlying these reductions. The authors find evidence consistent with a direct incapacitation mechanism, given that the reforms increase school attendance among youth aged 16–18 by 4.9 percentage points. However, effects on human capital accumulation and productivity are modest. The secondary school dropout rate falls by only 0.4 percentage points, and no significant effects on wages are found. The authors therefore conclude that persistent reductions in crime do not appear to be explained by improvements in education or labor-market outcomes but rather by a dynamic incapacitation mechanism. Through this channel, keeping youth in school during critical ages reduces early criminal involvement and, given the persistence of criminal trajectories, also reduces subsequent crime. According to their estimates, this mechanism explains 51%–84% of the reduction in arrests between ages 19 and 24. The study also presents a detailed cost–benefit analysis. Considering only contemporaneous effects, the policy has a benefit–cost ratio of 1.04. When persistent effects up to age 24 are included, the ratio increases to 2.10.

The most recent study of developed countries using this strategy is Ahrsjö *et al*. (2026). Building on the Swedish reform that extended compulsory schooling to 9 years, the authors complement the study by Hjalmarsson *et al*. (2015) by analyzing its intergenerational effects. Using administrative data and exploiting the gradual implementation of the reform across municipalities and cohorts, they define treatment assignment according to municipality of birth. To measure effects on the next generation, they estimate paternal and maternal exposure separately. The results indicate that, among children of fathers exposed to the reform, the probability of having any conviction decreases by 0.79 percentage points (3%), and the incidence of multiple convictions falls by 0.43 percentage points (5.8%). Disaggregating by crime type, they find reductions in violent offenses (0.265 percentage points), traffic offenses (0.446 percentage points), fraud (0.223 percentage points), and other offenses (0.408 percentage points), while effects on property and drug offenses are not statistically significant. Among sons of exposed fathers, they also document improvements in academic performance, health, and labor-market outcomes in adulthood, along with lower exposure to juvenile crime in their neighborhoods and schools. In contrast, they find no effects among children of exposed mothers or among daughters of exposed fathers. A mediation analysis suggests several potential mechanisms: increased parental education and income, improvements in cognitive and non-cognitive skills, reductions in paternal criminal involvement, and relocation to neighborhoods and schools with lower levels of juvenile crime. The absence of effects among children of exposed mothers is consistent with the findings of Bell *et al*. (2016) for the White population in the United States, as the legal changes in Sweden do not appear to have significantly affected mothers' education or employment. The authors do not conduct a formal cost–benefit analysis.

Two Studies from Latin America

The first of the two studies estimating the impact of compulsory schooling laws in Latin America is Gleditsch *et al*. (2022). The authors analyze the 1993 constitutional reform that made secondary education compulsory in Mexico and also sought to encourage students to continue to higher levels of education. Following the reform, secondary enrollment increased from 66% in 1992 to 84% in 2000, while tertiary enrollment rose from 29% to 43% over the same period. In this context, the study examines whether the sharp decline in homicides observed before the onset of the drug war—from

19 homicides per 100,000 inhabitants in 1992 to 8.6 in 2007—can be explained, at least in part, by the expansion of education induced by the reform.[2]

The authors find that a one-standard-deviation increase in secondary education coverage reduces the homicide rate by approximately 6 per 100,000 inhabitants, a substantial effect given that the national rate declined by 10 per 100,000 inhabitants over the period 1992–2007. However, they caution that these effects are observed only before the escalation of drug cartel–related violence. After 2007, the effects are no longer statistically significant, possibly because a growing proportion of homicides were linked to retaliation or power struggles between criminal organizations. In this context, the mechanisms through which education can reduce crime—higher opportunity costs, incapacitation, and stronger social bonds—may be less relevant than for traditional forms of interpersonal violence. Finally, although the effect of tertiary education coverage is also negative and significant in some specifications, these results are less robust than those for secondary education.

In the second study from the region, Nishijima and Pal (2023) analyze the effect of Brazil's Constitutional Amendment 59 of 2009, which extended compulsory schooling to age 17, on juvenile crime. The authors exploit variation in the increase in secondary school enrollment induced by additional federal transfers, using a DiD model with an annual panel of 5,560 municipalities between 2006 and 2013. In the absence of age-disaggregated crime data, they use violent deaths resulting from assaults and firearms among youth aged 15–19, measured both in logarithms and as rates per 10,000 inhabitants, and complement the analysis with hospitalizations due to assault as a proxy for less lethal forms of violence. The authors validate their empirical strategy through parallel-trends tests, an event study, and placebo exercises. In logarithmic specifications, treated municipalities show reductions of 2.8%–3.0% in deaths from firearms and assault and 4.3% in total violent deaths. In contrast, no significant effects are found when population-based rates are used, or for hospitalizations due to assault or suicides.

The authors argue that these effects operate mainly through the incapacitation channel, as they do not identify changes in economic incentives following the reform. However, the expansion of coverage was accompanied by clear signs of school overcrowding, including an increase of 0.91 students per classroom, a 1.9-percentage-point increase in the proportion of students attending evening shifts, and greater age–grade distortion. When the binary treatment indicator is replaced with a continuous measure of treatment intensity, the estimated effects weaken. The authors suggest that overcrowding attenuates the potential benefits of longer school attendance. The heterogeneity analysis reinforces this interpretation. In non-poor municipalities, reductions in crime of 3.1%–4.5% are observed, while in poor municipalities, characterized by larger class sizes, fewer teachers, and lower education spending, the effects are small and not statistically significant. The study therefore concludes that expanding compulsory schooling can help reduce juvenile crime, but its effectiveness depends critically on whether the expansion of coverage is accompanied by sufficient institutional capacity and school resources. Otherwise, the effects of incapacitation may be offset by deteriorating teaching conditions.

The first of four studies that do not rely on legal reforms to generate variation in years of schooling is Eriksson (2020), who analyzes the impact of Rosenwald schools, a philanthropic program that funded approximately 5,000 primary schools for rural Black children in the southern United States between 1913 and 1931. The author examines how the program influenced the probability of

[2] Using state-level data, the empirical strategy employs two instrumental variables to evaluate the impact of the reforms on homicide rates between 1992 and 2007: (i) the proportion of young men in each state who were of the age to have been affected by the reform; and (ii) the number of secondary schools in each state.

incarceration in adulthood, with the aim of studying the historical origins of the racial incarceration gap. Exploiting variation in program exposure across cohorts within the same county and comparing rural Black children with urban Black and rural White children, the author finds that full exposure to the program between ages 7 and 13 reduces the probability of incarceration by approximately 1.9 percentage points, equivalent to about 75% of the mean incarceration rate among Black men in 1940. The main mechanism is increased educational attainment. Full exposure increases schooling by 1.3 years, implying a reduction in incarceration of approximately 1.1 percentage points per additional year of education. The results suggest that primary education generated substantial social returns through crime reduction, even in a context of widespread discrimination, with persistent long-term effects larger than those documented in some contemporary studies of secondary education.

Using Danish administrative data on twins and within-pair fixed-effects models, Bennett (2018) shows that secondary education significantly reduces crime among males, although these effects are heterogeneous. Specifically, completing upper secondary education reduces men's probability of conviction for any offense by 9.5 percentage points, with reductions of 8 percentage points for property offenses and 2.5 percentage points for violent offenses. Effects emerge earlier among individuals whose parents have lower levels of education or who grew up in municipalities with high levels of juvenile crime. Among youth from more advantaged backgrounds, crime reductions emerge later but converge toward similar magnitudes in adulthood. The study also finds that academic upper secondary education has a larger crime-reducing effect than vocational or university education. Completing academic upper secondary education reduces the probability of conviction by 22 percentage points, compared with approximately 8 percentage points for vocational education, while university education shows no statistically significant effects. For women, effects are much more limited, and prior juvenile criminal involvement appears to be a stronger predictor of adult crime than education. Overall, the results suggest that secondary education, particularly the academic track, is an especially valuable tool for preventing crime among youth from more vulnerable backgrounds, as it reduces criminal involvement at early stages of the life cycle, when its consequences may be most persistent.

The third study in this category is Buonanno and Leonida (2009), who analyze the relationship between education and crime in Italy using an annual panel of 20 regions between 1980 and 1995 and dynamic models estimated using the system generalized method of moments (GMM), allowing them to control for unobserved regional heterogeneity, endogeneity, and crime persistence. The results show that one additional year of average schooling is associated with reductions in property crime rates, theft rates, and total crime; in the dynamic estimates, the negative effects persist for property crime and theft. A particularly relevant finding is that the effect appears to be explained by secondary rather than university education. In specifications with regional trends, a 1-percentage-point increase in the share of the population with a secondary school diploma is associated with a reduction of 0.118 in the property crime rate and 0.082 in the theft rate, while university education shows no statistically significant effects. The authors interpret these results as evidence that the relevant margin for reducing crime lies in preventing dropout and increasing secondary school completion, consistent with the hypothesis that marginal offenders are disproportionately youth who do not complete this level of education. Regarding mechanisms, they emphasize that education raises the opportunity cost of crime, reduces the time available for criminal activities, and may influence preferences, civic values, and perceptions of crime. Although the identification strategy requires stronger assumptions than those used in other studies included in this section, the results are consistent with findings suggesting that the relevant margin lies at the secondary rather than tertiary education level.

Finally, Huttunen *et al*. (2023) complement the literature by evaluating the impact of post-compulsory secondary education on crime in Finland, examining both the extensive margin and several intensive margins. The study exploits the structure of the Finnish education system, where compulsory education ends at age 16 and access to different types of upper secondary education depends on grade point average (GPA). On this basis, the authors implement three RD designs to estimate causal effects: (i) attending versus not attending upper secondary education (extensive margin); (ii) attending vocational versus academic upper secondary education (intensive margin 1); and (iii) attending an "elite" academic school versus a less selective one (intensive margin 2). Using administrative records and more than 10 years of follow-up data, they analyze effects on employment, wages, and crime, as well as potential mechanisms.

They find that admission to any upper secondary program significantly reduces the probability of being convicted of at least one minor offense, particularly offenses punishable by fines, but only among males. The estimated reduction is 52%, substantially larger than those documented in previous studies, which range from 6% to 14%. In contrast, no effects are found at either intensive margin, whether comparing admission to academic and vocational upper secondary programs or to academic schools with different levels of selectivity. Consistent with Bell *et al*. (2022), the authors argue that secondary education reduces the risk of initiating a criminal trajectory, as effects are concentrated on first offenses rather than recidivism or serious crimes, such as violent or property offenses. Regarding mechanisms, they rule out an explanation based on human capital accumulation, as reductions in crime precede effects on labor income. Moreover, in Finland, vocational upper secondary education generates higher wage returns than academic upper secondary education, yet no differences in crime are observed at this margin. There is also no clear evidence of immediate incapacitation effects, as reductions in crime emerge two to three years after admission. The authors also rule out improvements in peer quality as the main mechanism, as differences in peer quality are evident across all three margins, but effects on crime are observed only at the extensive margin. They suggest a "dynamic incapacitation" mechanism whereby access to upper secondary education equips youth with skills and networks that reduce their propensity to engage in crime during late adolescence, a period of particularly high risk. The study presents no heterogeneity analysis or cost–benefit estimates.

2.2. More Time in School: Policies or Programs That Modify the Time Children and Youth Spend in School

This group of studies examines how the amount of time children and youth spend in school affects their involvement in crime. Unlike the literature assessing the long-term effects of additional years of schooling, which operates primarily through human capital accumulation over the life cycle, higher expected returns, and a greater opportunity cost of engaging in crime during adulthood, this body of research focuses on contemporaneous effects. It identifies crime reductions mainly through incapacitation, whereby more time in school reduces the time available for criminal activity, particularly among high-risk youth who lack structured activities outside school hours.

Early studies relied on school closures driven by budget constraints, teacher professional development days, and teachers' strikes as sources of variation in school attendance. More recently, several studies have examined the effects of extended school-day policies in Latin America and the Caribbean, including evidence from Chile, Colombia, the Dominican Republic, Mexico, and Brazil. This review includes eleven studies, six of which provide evidence from Latin America and the

Caribbean, with most using DiD strategies that compare cohorts, days, or groups exposed and unexposed to changes affecting time spent in school.[3]

Table 1 shows that, among the eleven studies reviewed, 55% report reductions in non-violent crime, particularly property offenses, consistent with an incapacitation or supervision mechanism: while young people are in school, they have less time available to engage in criminal activities outside school. However, the evidence regarding violent crime is more heterogeneous and highlights important trade-offs. Within this group, 36% of the studies report reductions in violent crime, 36% report increases, and 18% find no statistically significant effects. In the United States, certain school closures or changes in the school calendar significantly affect youth violence, suggesting that schools can function not only as spaces of supervision and protection but also as settings where conflicts are concentrated and, in the absence of complementary interventions, physical violence may escalate.

In contrast, the still-limited evidence from Latin America and the Caribbean is more encouraging. In Chile, studies document reductions in overall crime, property offenses, and youth violence following the implementation of the Full School Day reform (Jornada Escolar Completa, JEC), including lower arrest rates among public school students who would otherwise have attended afternoon-shift schools. In Bogotá, schools participating in extended-day programs experienced reductions in injuries, theft, and drug trafficking. Evidence from Pernambuco, Brazil, indicates that full-time schools reduced homicides among young men. Mexico's Full-Time Schools Program (Escuelas de Tiempo Completo) also reduced common theft, particularly at the secondary level and in vulnerable municipalities. Finally, evidence from the Dominican Republic shows reductions in male homicides, particularly outside school hours, but an increase in vehicle thefts during those same hours. Although the results are not uniform, the regional evidence suggests that structured extensions of the school day may reduce crime when they combine additional supervision with meaningful academic or extracurricular activities.

The overall evidence suggests that effects depend critically on the type of reform implemented. In the United States, many studies analyze abrupt shocks or unexpected school closures. In Latin America and the Caribbean, by contrast, reforms typically involve more structured extensions of the school day that include additional components, such as sports, arts, or academic support activities. This distinction is important because it suggests that additional time in school does not operate mechanically. Table 11 helps clarify this point. A total of 64% of the studies in this group identify incapacitation or supervision as the primary mechanism, while 36% mention peer or concentration effects, and 9% point to human capital accumulation. In other words, the same intervention may reduce opportunistic crimes committed outside school while simultaneously increasing conflict if greater interaction among youth is not accompanied by effective supervision, conflict-management strategies, and structured programming.

The first study in this line of research is Jacob and Lefgren (2003), whose title references the well-known phrase "idle hands are the devil's workshop," suggesting that more school days could reduce juvenile crime. As an identification strategy, the authors exploit exogenous variation in school

[3] Lavy (2020) analyzes the effects of increasing school resources and instructional time on several non-cognitive outcomes, including measures of school violence. The study finds that increasing school resources and extending the school week improve academic outcomes without increasing self-reported school violence or reducing students' social or school satisfaction. However, it is not included in this review because its measure of school violence primarily captures dimensions of school climate, such as classroom fights, fear of attending school due to the presence of violent students, and self-reported involvement in violent activities. Therefore, it does not fit the definition of school crime used in this review, which includes arrests, charges, or officially recorded incidents occurring in the school environment.

attendance generated by teacher professional development days in Chicago between 1995 and 2002, when students do not attend classes. Linking this information to daily administrative crime records and estimating DiD models, they find that juvenile property crime falls by 14% on school days (equivalent to 0.29 fewer offenses per day), supporting the incapacitation mechanism. However, they also document a 28% increase in juvenile violent offenses (equivalent to 0.25 additional offenses per day), which they attribute to the concentration effect arising from greater interaction among youth. The authors conclude that while the incapacitation channel is relevant, any policy that increases time spent in school must also consider its potential effects on violence.

A few years later, Luallen (2006) complements the findings of Jacob and Lefgren (2003) but uses teachers' strikes rather than teacher professional development days as a source of variation in school attendance. Using data from Washington State between 1980 and 2001, he estimates negative binomial regression models to evaluate the effect of these unexpected school absences on juvenile crime. Luallen argues that, unlike professional development days, which are scheduled in advance and allow families to organize supervised activities, strikes are unpredictable, often last several days, and therefore generate longer periods without supervision. Consistent with this hypothesis, the study finds that juvenile crime falls by 21% on days when youth attend school. However, when disaggregated by crime type, the effects are heterogeneous. Property crime falls by 29% and minor offenses by 48%, while violent offenses increase by 31%–36% on school days. Moreover, the increase in violent crime is concentrated among youth with prior criminal records, while the reduction in property offenses is driven primarily by first-time offenders, suggesting that school absence can serve as an entry point into crime. The effects are statistically significant and concentrated in urban areas. The author concludes that how youth spend their time outside school is crucial for preventing juvenile crime.

A subsequent study by Berthelon and Kruger (2011) evaluates the effects of the JEC reform in Chile, which extended school attendance from half-day to full-day. Using a quasi-experimental design that exploits temporal and geographic variation in the implementation of the reform, the authors estimate effects on different types of crime. Contrary to what might be expected from the evidence in the United States, the increase in time spent in school did not increase violence, which the authors attribute to better supervision and less concentration of conflicts. Additionally, as in Luallen (2006), effects are larger among youth without prior criminal records, suggesting an important role for schools as an instrument of primary prevention. Although the policy was not designed with this objective, the authors conclude that extending the school day generates significant social benefits by reducing risky behaviors among vulnerable adolescents.

Pires and Urzúa (2015) complement the work of Berthelon and Kruger (2011) on the effects of the JEC reform in Chile, estimating its impact on a broader range of long-term outcomes. Their empirical strategy exploits variation in the implementation of the reform across schools within municipalities. The authors find a significant reduction in the probability of arrest among public school students who attended full-day schooling, particularly those who, in the absence of the reform, would have attended the afternoon shift.[4] However, the effect is not robust across all specifications and loses statistical significance when the full sample is used. According to the authors, the most plausible mechanism combines additional instructional time, greater adult supervision, and changes in the organization of the school day. Although full-day schooling may improve learning, the authors

[4] The study also reports that full-day schooling reduces adolescent motherhood and school dropout and improves some cognitive outcomes.

emphasize that additional time does not necessarily generate benefits if it is not used productively. This helps explain the heterogeneity by school type, with effects appearing more favorable in voucher schools, where the authors suggest there may have been greater monitoring and more effective use of additional time. They do not conduct a cost–benefit analysis.

Continuing with the evidence from the United States, Akee *et al.* (2014) analyze the effect of school attendance on juvenile crime, using as a source of exogenous variation the budget-related closure of Hawaii's public schools during the 2009–10 school year. In response to fiscal constraints, the government canceled classes on 17 Fridays, affecting all public school teachers. Using negative binomial models and daily administrative arrest data from the island of Oahu, the authors find that on days without classes, arrests for assault fell by 69%–77%, with larger effects in lower-income areas. Reductions are also observed in drug-related offenses (sale, manufacture, and possession), although the largest effects for these offenses occur in higher-income areas. The authors also find that effects were more pronounced among males and during school hours (6 a.m. to 2 p.m.), although reductions in assaults were also observed in the afternoon. They argue that the effects are larger than those reported by Jacob and Lefgren (2003), possibly because the closures coincided with greater parental presence, as many parents employed in the public sector also did not work on those days. This study provides important evidence that, in certain contexts, school attendance can increase exposure to risky situations or conflict, highlighting the need to reconsider how school time is structured, particularly for adolescents in vulnerable contexts.

Billings and Phillips (2017) employ a DiD strategy using daily administrative data from North Carolina between 1998 and 2011. As in previous studies, they exploit exogenous variation generated by teacher professional development days, when students do not attend classes. Unlike earlier studies, the authors complement their analysis with georeferenced information disaggregated by crime type, time period, location, and school composition. They find that on days without classes, total reported crime decreases by 4.2%, driven primarily by a 7% reduction in violent offenses, including physical assault, sexual assault, and weapons possession. They also find a 33% reduction in juvenile arrests for violent offenses. Unlike Jacob and Lefgren (2003) and Luallen (2006), they identify no significant effects on property offenses. The authors find heterogeneous effects according to student composition. In areas with high-risk schools (those with a high proportion of vulnerable youth), crime falls on non-school days, while in neighborhoods with low-risk schools, crime tends to increase. This suggests that peer interactions in school can amplify or reduce criminal behavior depending on the environment. The study highlights that schools can serve as spaces for supervision and protection or as points of contact for criminal networks, and that the composition of student groups is a critical channel to consider in juvenile crime prevention policies.

The most recent study from the United States in this group is Fischer and Argyle (2018), who estimate the causal effect of the four-day school week—also adopted as a cost-reduction strategy—on juvenile crime in rural Colorado between 1997 and 2014. Exploiting the staggered adoption of the four-day calendar, typically with Fridays off and additional hours on other days, and using a DiD strategy, they analyze changes in offenses among youth aged 14–17. They find that, following adoption, total juvenile offenses increase by approximately 20%, with a more pronounced effect on property offenses; no changes in violent offenses are observed. The pattern is consistent with partial incapacitation: with Friday becoming a non-school day, Thursday becomes the "new Friday," and crime increases by approximately 34% on Thursday and 25% on Saturday. By contrast, crimes occurring in schools fall significantly on Fridays (approximately 61%). The authors report that this schedule can generate operational savings of 10%–25%, including lower expenditures on school

transportation, electricity, and other costs. However, when the costs of crime are taken into account, total net savings may be negative, although the authors do not formally estimate them.

In Colombia, Gómez Fernández (2019) evaluates the impact of the Jornada Única and Jornada 40x40 programs, implemented in public schools in Bogotá, on local crime rates. Both programs extended the school day to 8 hours, 3 more than the traditional schedule, but differed in structure. Jornada Única extended academic instructional time within schools, emphasizing subjects such as mathematics, science, and language. The Jornada 40x40 strategy complemented the school day with extracurricular activities, such as art, sports, and music, at specialized centers managed by the District. Using a DiD strategy with spatial data, the study compares areas with different levels of exposure to these programs through geographic buffers constructed around treated and untreated schools between 2005 and 2010. The results show that extending the school day reduced incidents of personal injury by an average of 7%, theft from persons by 12%, and drug trafficking by 23%, among other offenses. These effects are concentrated primarily in areas exposed to the Jornada 40x40 program, although the author notes that the sample includes only a limited number of schools participating in Jornada Única. The study does not include a formal cost–benefit analysis.

Rosa *et al*. (2022) evaluate the Programa de Ensino Médio Integral in Pernambuco, Brazil, a policy that converted public secondary schools from part-time (5 hours per day) to full-time (10 hours per day). The program expanded gradually beginning in 2004, with the goal of ensuring that every municipality in the state had at least one full-time school. The empirical strategy uses a multiperiod DiD model comparing treated municipalities with two control groups: municipalities in Pernambuco not yet treated and neighboring municipalities in other states that did not implement the policy during the period analyzed. The main outcome is the municipal homicide rate among males aged 15–19. The authors find that the introduction of a full-time school reduces this rate by 12.3–16.5 homicides per 100,000 inhabitants, equivalent to approximately a 38%–51% reduction relative to the mean, depending on the comparison group and controls included. The study does not analyze other types of crime or disaggregate results by socio-economic level, municipality type, or sex beyond the male population studied. However, it shows that effects increase with the duration of municipal exposure to the policy. The reduction in homicides is approximately 7.3 per 100,000 inhabitants during the first four years, 15.8 during years five through eight, and 20.7 after eight years of implementation. Additionally, a placebo test for males aged 20–24 finds no effects, reinforcing the conclusion that the reduction is concentrated among the directly exposed population. Regarding mechanisms, the authors interpret the results primarily through incapacitation, although they acknowledge that greater human capital accumulation and the postponement of first offenses cannot be ruled out as additional channels. The study presents no formal cost–benefit analysis or estimates of the cost per homicide avoided, although it emphasizes that such policies require substantial investment and have important cost–benefit implications.

Finally, the most recent studies in this literature come from Mexico and the Dominican Republic, and both examine the effects of extending the school day on municipal-level crime outcomes. Cabrera-Hernández and Zárate-Tenorio (2026) exploit the staggered implementation of the Escuelas de Tiempo Completo program in Mexico, which extended the school day from 4.5 to 8 hours in public primary and secondary schools, to analyze whether extending the school day reduces adolescent involvement in criminal activities through the incapacitation channel. Using municipal-level administrative crime data and DiD models that account for treatment-effect heterogeneity and multiple treatment periods, they find that adoption of the program reduced common theft by 43 offenses per 100,000 inhabitants, equivalent to an 11% decline relative to the baseline rate. The effect is concentrated among adolescents aged 12–14 in municipalities with secondary schools,

while no effects are observed at the primary school level. Moreover, effects are larger in municipalities with lower socio-economic status, where the reduction reaches approximately 53 offenses per 100,000 inhabitants.

The authors find no significant effects on serious crimes, such as homicide or kidnapping, suggesting that the program operates primarily through incapacitation and possibly improvements in human capital accumulation but does not affect more serious forms of crime associated with other dynamics, such as criminal group activity. They conclude that extending school time during early adolescence can be an effective, noncoercive crime prevention strategy, particularly in more vulnerable contexts. Furthermore, by evaluating the Escuelas Seguras strategy in the same study, which involved informational and training activities for school principals and teachers aimed at preventing violence, they find no significant effects. The observed reduction in crime is therefore attributed to the extension of the school day. No cost–benefit estimates are presented.

Garganta *et al*. (2026) examine the effects on crime of the Extended School Day program (Jornada Escolar Extendida, JEE) in the Dominican Republic. The program was part of a nationwide education reform that increased public education spending from approximately 2.5% to 4% of GDP and doubled the school day from four to eight hours. Its expansion was supported by a national school infrastructure program targeting the construction of 28,000 additional classrooms, alongside investments in teachers and staff. The authors exploit the staggered rollout of the JEE in secondary education (grades 7–12) across municipalities, combining administrative school-level data with municipal records on homicides and vehicle thefts from 2009 to 2019. Their empirical strategy relies on a two-way fixed-effects specification with municipality and year fixed effects, province-specific linear trends, and time-varying municipal controls. Treatment is defined by the adoption of the JEE in at least one secondary school within a municipality. Accordingly, the estimates capture the effects of municipality-level exposure to the program rather than individual-level effects of attending an extended-day school.

The authors find no statistically significant effects on aggregate homicide or vehicle theft rates. However, male homicides decline by 0.021–0.022 per 1,000 inhabitants, equivalent to a 13% reduction relative to the pre-reform rate. Reductions in homicides are concentrated outside school hours, with no detectable effects during school hours. The authors interpret this pattern as more consistent with persistent changes in human capital or risk-related behavior than with a pure incapacitation mechanism, although these channels are not directly identified. In contrast, vehicle thefts show no aggregate reduction but increase outside school hours, suggesting a possible temporal displacement of property crime. The study does not conduct a formal cost–benefit analysis, although it notes the substantial infrastructure and personnel investments required to implement the reform.

2.3. Better Quality: Access to Higher-Quality Education and Improved Learning

The previous two sections consistently documented that increasing exposure to school, whether through additional years of schooling, more school days, or more hours per day, reduces the probability of youth involvement in criminal activities. However, the evidence indicates that the quality of education individuals receive is as important as, or even more important than, the quantity of education they accumulate. Economic research has documented that attending higher-quality schools generates positive returns in the labor market, earnings, and educational attainment.

Accordingly, a more recent body of research has sought to understand how access to higher-quality educational institutions affects involvement in criminal activities.

This review identified 12 studies that estimate the causal effects of school quality and the broader educational environment on crime. The interventions examined include access to magnet, charter, or otherwise preferred schools; policies that alter the racial and socio-economic composition of schools through the introduction or termination of desegregation mandates; improvements in school-level academic and socio-emotional effectiveness; and access to high-quality education institutions.

The definition of educational quality varies widely across studies. In some cases, it is measured by standardized test scores, school rankings within districts, teacher composition, the academic profile of enrolled students, or graduation rates. In others, quality is approximated through value-added estimates for both academic outcomes and non-academic variables, including behavioral measures, educational trajectories, and crime. Ten of these studies analyze the effects of educational quality at the primary and secondary levels, while the remaining two focus on the quality of higher education institutions.

To address endogeneity, the studies exploit lotteries that randomize access to certain schools, the introduction or abolition of mandatory school busing policies that provide access to preferred schools outside students' neighborhoods, or exogenous variation generated by admission score cutoffs. The review also includes merit-based scholarship-loan programs that facilitate access to high-quality private education.

Compared with other educational policies, the evidence on school quality is less extensive and somewhat more heterogeneous, although the available results are generally favorable. Table 1 shows that, among the 12 studies reviewed, 58% find reductions in non-violent and violent crime, 42% find reductions in incarceration, and 33% find reductions in school-related crime. No study reports increases in crime associated with attending higher-quality schools. However, a substantial proportion of results are not statistically significant, and many studies do not examine all outcome dimensions.

Cullen *et al.* (2006) were among the first to rigorously evaluate how school quality affects juvenile crime in the United States. To address endogeneity in school selection, they exploit the school choice policy in the Chicago public school system, which allows families to apply to magnet schools outside their neighborhoods but within the same district. When demand for a school exceeds available places, students are assigned through random lotteries. The analysis is based on administrative data from 194 lotteries at 19 public schools involving students entering ninth grade in 2000 and 2001. The authors also note that attrition is not a threat to their analysis, as more than 90% of students, regardless of whether they won or lost the lottery, enrolled in a district school in ninth grade.

The results show that winning a lottery does not generate significant academic improvements in standardized test scores, attendance, or graduation. In fact, among students with lower prior achievement, access to higher-quality schools worsens their relative position in academic rankings and increases their dropout rate, suggesting academic mismatch effects. The authors rule out alternative explanations for these results. Lottery winners do attend schools with better indicators, parental involvement does not systematically decline, and longer commuting distances do not appear to play a significant role. However, when analyzing non-academic outcomes using student surveys, the authors find positive effects. Students who win a lottery to attend the best schools in the district report an 8.7-percentage-point reduction in the probability of experiencing disciplinary

incidents and a 60% reduction in the probability of having been arrested (5.1 percentage points from a baseline of 8.9%). The study does not identify the underlying mechanisms or report cost or cost-effectiveness estimates.

Weiner *et al*. (2009) broaden the analysis of school quality beyond policies that provide selected students with access to preferred schools. The authors study court-ordered school desegregation, one of the largest policies implemented in the United States to alter the racial composition of schools. Beginning in the 1960s, federal courts required many large urban school districts to dismantle segregated systems through measures that included redrawing attendance zones, pairing schools, creating magnet programs, and transporting students across neighborhoods. These policies potentially changed several dimensions of the educational environment simultaneously, including peer composition, school resources, educational attainment, and students' exposure to more integrated social settings. Unlike school choice lotteries, which estimate effects on students who move while leaving the wider system largely unchanged, desegregation orders make it possible to examine whether reorganizing students across schools reduces crime overall or merely redistributes it across institutions and neighborhoods.

The authors exploit plausibly exogenous variation in the timing of federal desegregation orders across large urban school districts and combine this variation with county-level homicide and arrest records. They find that implementation of the orders reduced homicide victimization among Black youth by approximately 25%, while estimated reductions in homicide arrests range from 30% to 50%. The effects were largest in districts where Black students experienced greater increases in exposure to White students and persisted into adulthood only among cohorts that attended desegregated schools. The authors conclude that increased educational attainment explains part of the effect, as previous estimates indicate that the orders reduced dropout among Black students by approximately 25%, which could account for a substantial portion of the decline in homicide arrests. Changes in peer environments and spillovers from lower youth offending may also have contributed. Although the study does not conduct a comprehensive cost–benefit analysis, it estimates gross benefits from avoided homicides of nearly US$1,000 per Black student and US$200 per White student, substantial amounts relative to average per-pupil expenditure of approximately US$2,750.

Deming (2011) analyzes the impact of attending higher-quality schools on juvenile involvement in crime, using data from the Charlotte-Mecklenburg Schools (CMS) district, which implemented an open enrollment policy in 2002. This policy allowed families to apply to schools outside their residential zones, with places at oversubscribed schools assigned through random lotteries. Although the identification strategy is similar to that of Cullen *et al*. (2006), this study makes three important contributions: (i) it uses administrative records of arrests by local police rather than self-reported survey data; (ii) it follows students for up to seven years, allowing the estimation of medium-term effects; and (iii) it distinguishes between the effects of accessing lower secondary schools (grades 6–8) and upper secondary schools (grades 9–12).

The results show that, while there are no significant effects on standardized test scores, improvements are observed in educational indicators such as school retention, lower grade repetition rates, and reductions in suspensions and unexcused absences. Regarding crime, winning a lottery significantly reduces the probability of arrest, particularly for violent offenses (61%) and drug-related offenses (68%), and reduces sentence duration by 43%, suggesting a reduction in the severity of crimes committed. These effects are particularly pronounced among students with the highest *ex ante* risk of engaging in criminal activities. Additionally, effects are larger when students gain access to a middle school, suggesting that earlier school transitions have more lasting effects.

At this level, the main mechanism identified is exposure to higher-quality peers. At the high school level, by contrast, effects are explained by better institutional quality and a higher probability of remaining on track academically, a mechanism that explains up to 45% of the effect on crime.

Overall, the results suggest that the benefits arise from changes in the school environment, including peer composition and teacher quality, equivalent to moving a student from a very low-quality school to an average-quality school. The policy also helped redistribute high-risk youth within the system, preventing their concentration in more vulnerable environments. Although the study does not present a formal cost–benefit analysis, marginal costs are low because the policy involves reassignment within the public school system. The author estimates that optimal assignment based on crime risk could reduce the social costs of crime by 27%, while the model implemented by CMS, which prioritized students from more vulnerable households, achieved a reduction of approximately 12%. Additionally, the policy encouraged competition among schools. Several middle schools that lost enrollment became magnet schools offering specialized programs, while some low-quality high schools eventually closed. Thus, the policy not only improved access to higher-quality schools but also reshaped the district's educational offerings. Although the author does not explicitly discuss this implication, the findings reinforce the importance of early school interventions in reducing the probability of future involvement in criminal activities.

Providing complementary evidence on the reversal of the policy examined by Weiner *et al*. (2009), Billings *et al*. (2014) analyze what happened when court-mandated desegregation ended and students were reassigned to more segregated schools. Specifically, they study the impact of ending the mandatory school busing policy in the CMS district, known as "race-based busing."[5] Using administrative school data and crime records for cohorts entering sixth grade between 1996 and 2002, the authors estimate the effects of being assigned to a school with a higher proportion of minority students, primarily African Americans. The results show that increased school segregation following the end of race-based busing adversely affected both academic outcomes and crime, particularly among students from vulnerable backgrounds. A 10-percentage-point increase in the proportion of minority students in a school is associated with a 0.014-standard-deviation decline in standardized test scores for all students, regardless of race. Additionally, among White students, the probability of graduating from secondary school and enrolling in tertiary education decreases, particularly among the first cohorts exposed to the change. The authors suggest that these academic effects diminished over time because of the gradual reallocation of resources to schools with higher proportions of minority students. For crime, however, the adverse effects are significant and persistent. A 10-percentage-point increase in the proportion of minority students increases the probability of arrest or incarceration among African American males by 1.5 percentage points (8%). Unlike the academic effects, which diminish over time, the effects on crime persist. The authors conclude that the school environment and peer interactions are important determinants of juvenile criminal trajectories, consistent with the literature on time spent in school reviewed earlier.

Dobbie and Fryer (2015) estimate the impact of attending a high-performing charter school using sixth-grade admission lotteries conducted in 2005 and 2006 at Promise Academy, part of the Harlem Children's Zone. Unlike previous evidence on charter schools, which does not always show

[5] Under this policy, introduced in 1971, students received free transportation between neighborhoods to reduce racial segregation in public schools. It was one of the most ambitious social policies of the 20th century in the United States and was associated with improvements in education, income, and health, as well as reductions in arrests and homicides among African Americans. However, in the late 1990s, the policy was eliminated, and students were again assigned to schools in their residential neighborhoods. This reassignment redefined school attendance zones within the district and generated quasi-experimental variation, allowing comparisons of students residing in the same neighborhood but assigned to different public schools based on their exact addresses.

improvements in academic outcomes, the authors focus on an exceptionally high-quality school.[6] The results show substantial improvements in learning, measured by standardized tests, and in on-time educational progression, including a higher probability of graduating within four years and immediately enrolling in higher education. However, differences in total years of schooling tend to diminish in the medium term as students in the control group catch up. Regarding behavioral and crime outcomes, the study finds a 4.4-percentage-point reduction in the probability of incarceration by age 23 among males (from a baseline rate of 13.5%), but no significant effect among females. The authors suggest that the effects operate through intensive human capital accumulation and rigorous educational practices. McEachin *et al*. (2020) complement the work of Dobbie and Fryer (2015) by analyzing the long-term effects of attending a charter school from a broader perspective. Unlike the previous study, they do not focus on a single school but on the full set of charter schools in North Carolina.[7]

The study estimates effects on seven outcomes, including academic variables, voter participation, and three crime-related indicators: conviction for any offense, a misdemeanor,[8] or a felony. Crime data come from the North Carolina Department of Public Safety, and the empirical strategy combines linear probability models and matching, given the absence of random assignment. The results indicate that attending a charter school reduces the probability of conviction for any crime by 0.9 percentage points, for a misdemeanor by 0.7 percentage points, and for a felony by 0.4 percentage points, equivalent to relative reductions of 30%, 31.8%, and 30.8%, respectively. Effects are larger among males and African American students, consistent with the hypothesis that these groups benefit relatively more from structured school environments. Similarly, larger effects on reducing suspensions and increasing voter participation are observed among students from more vulnerable backgrounds. The authors interpret these patterns as evidence of greater school engagement, an improved institutional climate, or stronger non-cognitive skills, although they acknowledge that they cannot causally attribute the effects to these mechanisms. The study does not report cost–benefit estimates.

Jackson *et al*. (2020) use administrative records from Chicago public schools linked to annual student surveys to estimate school value-added models for socio-emotional development. Specifically, they construct indices for two non-cognitive domains measured in ninth grade: “hard work and discipline” and “social well-being.” The models control for prior test scores, prior socio-emotional development, attendance, disciplinary records, demographic characteristics, and neighborhood characteristics, and incorporate validation exercises that support a causal interpretation of schools’ effects on these behavioral indices. Using these value-added measures, the authors estimate short-term effects in ninth grade on standardized test scores, absences, disciplinary sanctions, and academic delays, as well as longer-term effects on secondary school graduation, enrollment in higher education, and persistence at that level.

Even after controlling for value-added in cognitive test scores, attending schools with higher value-added in socio-emotional development improves educational trajectories and reduces school-based arrests. In ninth grade, an increase in a school’s social well-being value-added raises the

[6] Their research design exploits the random assignment of places among 570 applicants, using surveys of 407 youth and matching these data with administrative records from the school system and the National Student Clearinghouse.

[7] Additionally, rather than relying on self-reported data, the authors use administrative information from various official sources. The analysis covers all cohorts of students who entered ninth grade between 2004 and 2011, including approximately 9,500 charter school students and approximately 12,000 traditional public school students in the comparison group.

[8] The authors define misdemeanors as offenses such as possession of small amounts of drugs, petty theft, disorderly conduct, and reckless driving, and felonies as offenses such as aggravated assault, burglary, possession of drugs with intent to distribute, sexual offenses, and violent crimes involving weapons.

probability of being academically on track, reduces absences, and decreases disciplinary incidents. In the longer term, increases in both social well-being and hard work and discipline value-added are associated with higher graduation and university enrollment rates, along with improvements in persistence. Regarding crime, from a baseline probability of 4.06% of experiencing at least one school-based arrest, a one-standard-deviation increase in social well-being value-added reduces the probability of arrest by 0.728 percentage points (17.9%), while an equivalent increase in hard work and discipline value-added reduces it by 0.766 percentage points (18.9%). These effects are larger than the reduction associated with test score value-added, which reaches 0.523 percentage points (12.9%). Overall, the results support the hypothesis that improvements in socio-emotional development promoted by schools can translate into lower crime rates through behavioral channels, even after controlling for cognitive learning. Although the authors do not estimate heterogeneous effects, they document substantially higher arrest rates among males and African American males, suggesting greater potential for impact among these groups.

Beuermann *et al*. (2023) complement the evidence from Jackson *et al*. (2020) by using administrative data from 132 public schools in Trinidad and Tobago between 1995 and 2012 to analyze how schools affect outcomes beyond academic performance and how parents value these additional dimensions. The authors highlight the multidimensional nature of school effects by estimating each school's value-added in academic achievement and long-term outcomes, such as dropout, adolescent pregnancy, juvenile arrests, and labor-market participation. They also link these measures to parents' revealed preferences, based on the rankings parents submit when applying to secondary schools through a centralized assignment system that considers entrance examination scores and family preferences.

The study finds that schools generate substantial and heterogeneous effects across multiple dimensions, including test scores, dropout, adolescent pregnancy, and formal employment. Regarding juvenile crime, attending a higher-quality school reduces the probability of arrest by 2.6–5.2 percentage points, equivalent to relative reductions of 80%–160% compared with a mean of 3.3%. Furthermore, the correlation between school effects on academic and non-academic outcomes is low, suggesting that these dimensions capture different aspects of school quality. Finally, the authors show that parents value these dimensions differently depending on student characteristics. Parents of students with high prior achievement tend to prioritize schools with strong academic effects, while those whose children have lower prior achievement place greater value on school effects on non-academic outcomes, such as crime and adolescent pregnancy. The study does not present cost–benefit estimates.

Jackson *et al*. (2024) extend their earlier 2020 study by analyzing heterogeneity in the effects of attending more effective schools according to students' initial levels of preparation in Chicago public schools. Specifically, they examine whether schools with higher value-added in academic test scores and socio-emotional skills have differential effects according to student characteristics. To do so, they construct a student skill index based on academic performance and behavior in eighth grade, which predicts subsequent human capital accumulation. They then use previously estimated measures of school effectiveness to evaluate how the effects of attending a more effective school vary across long-term educational and behavioral outcomes.

They find that all students benefit from attending more effective schools, but the marginal effects are considerably larger for those with lower initial preparation. For example, a student in the bottom decile of the skill distribution who is reassigned from a school at the median of effectiveness to one at the 85th percentile experiences a 3.8-percentage-point increase in secondary school graduation, a 3.6-percentage-point increase in higher education enrollment, and a 2.1-percentage-point reduction in school-based arrests. For students in the top decile, these effects fall to 0.5, 1.5, and 0.22 percentage points, respectively. Similar patterns are observed when disaggregating by ethnic group and gender. The authors argue that these effects arise because students with initial disadvantages respond more strongly to improvements in socio-emotional skills fostered by more effective schools. However, they also document that, in practice, students with lower initial preparation disproportionately attend schools with lower value-added. Through counterfactual simulations, they show that closing the least effective schools and redistributing their students among existing schools would generate net social gains, as the benefits for reassigned students are substantial and the negative effects on students in receiving schools are marginal.

Doty *et al*. (2026), in the most recent study on this topic, analyze whether improvements in state-level eighth-grade mathematics scores on the National Assessment of Educational Progress (NAEP) predict better long-term economic and social outcomes or merely reflect changes without meaningful effects on subsequent trajectories. To do so, they link changes in these scores since 1990 to outcomes by birth cohort and state of birth, using the American Community Survey and FBI arrest data. For identification, the authors control for race, parental education, labor-market conditions, state and birth-cohort fixed effects, and census division-by-birth-year effects. The results show that a one-standard-deviation increase in mathematics scores is associated with a 6%–8% increase in labor earnings in adulthood, along with higher secondary school graduation and university enrollment rates and lower unemployment. Regarding crime, they find a 1.7-percentage-point reduction in the male incarceration rate between ages 18 and 24 and reductions of 30% and 18% in arrests for violent and property crimes, respectively. Overall, the study concludes that broad and sustained improvements in learning translate into substantial long-term economic and social benefits.

Two studies in this group analyze the effects of university institutional quality. Duryea *et al*. (2025) estimate the causal effect of admission to a free, high-quality public university in Brazil on the probability of facing criminal charges during the decade following application. To do so, the authors exploit an RD design based on the admission examination score cutoff, comparing applicants who scored just above and below the threshold. The results show that admission reduces the probability of criminal prosecution by 2.5 percentage points in the full sample, equivalent to a 69% reduction relative to the baseline mean. The effect is concentrated almost entirely among low-income applicants, for whom the probability of facing criminal charges falls by 4.3 percentage points, equivalent to approximately 77% relative to the comparison group. Moreover, the reduction is driven primarily by a decline in violent offenses, which reaches 3.2 percentage points among low-income youth, equivalent to a reduction of approximately 89%.

The study also shows that these effects do not appear to be explained by traditional economic mechanisms. Although admission increases graduation from the elite university and raises future earnings for some low-income subgroups, the authors find that the reduction in crime is not associated with higher wages, greater formal employment, or greater educational attainment overall. In fact, the largest effects on crime are observed among low-income students admitted to programs with a higher proportion of students from high socio-economic backgrounds, while wage increases are concentrated in other programs where no effects on crime are detected. The authors therefore

conclude that the most plausible mechanism is related to institutional quality and the exposure of vulnerable students to higher-quality university environments and different social compositions, rather than direct monetary returns.

Fajardo Vanegas (2023) analyzes whether the Ser Pilo Paga program, a scholarship-loan program designed to help high-achieving, low-income students attend high-quality universities in Colombia, reduced the probability of involvement in criminal activities. To do so, he uses an RD design based on the program's two eligibility criteria: the Saber 11 score and the Sisbén III score. Linking administrative education records to National Police arrest records, the author constructs arrest indicators for periods ranging from one to four years after the examination. Among males, the results show a 0.054-percentage-point reduction in the probability of arrest within one year of the examination at the socio-economic vulnerability cutoff, equivalent to 45% of the control group mean. At four years, he finds a reduction of 0.31 percentage points, equivalent to 126% of the corresponding control group mean. These effects are statistically significant in specifications without controls.

To analyze potential mechanisms, the author disaggregates effects by crime type. He finds a 0.26-percentage-point reduction in property crime arrests after one year at the academic merit cutoff, equivalent to 362% of the control group mean. At four years, the estimated reduction in property crime remains negative, at 0.21 percentage points, equivalent to 94% of the control group mean, although it loses statistical significance. At the socio-economic vulnerability cutoff, reductions in property crime are also observed but are not statistically significant. Results for drug-related and violent offenses also point in the expected direction but are imprecise and less robust. The author interprets these findings as consistent with a human capital mechanism, whereby access to high-quality higher education could increase the opportunity cost of committing crime. It is worth noting, however, that unlike the previous study, the estimated effects are less robust, are measured over a shorter time horizon, and lack labor-market information that could validate or rule out this hypothesis.

2.4. Starting from the Cradle: Early Childhood Education

The evidence on the effects of early childhood programs on involvement in criminal activity is among the strongest examined in this review (García *et al*. 2019). Early childhood education generally includes comprehensive care, health, and development programs targeting cognitive and socio-emotional skills among children aged 0–6. Most of the programs analyzed target vulnerable children in the United States and Spain. They include small, intensive programs such as the Perry Preschool Program (Michigan) and the Abecedarian Project (North Carolina), as well as large-scale interventions such as Head Start (offered nationwide), the Chicago Child-Parent Center Program, Boston PreK, the large-scale expansion of the preschool system in Spain, and the expansion of early childhood education in Quebec, Canada.

This section synthesizes the main findings of 16 studies based on long-term evidence from the United States, Canada, and Spain. Regarding methodology, identification for small, intensive programs relies on randomized controlled trials (RCTs) implemented under highly controlled conditions. For large-scale interventions, identification relies on quasi-experimental strategies such as matching, sibling comparisons, DiD approaches, and RD designs applied to programs such as Head Start, the Chicago Child-Parent Center Program, and the large-scale expansion of preschool systems in Spain and Canada. The only large-scale experimental study with long-term follow-up evaluates preschool attendance in the Boston public school system (Boston PreK).

A substantial body of studies finds effects on crime-related outcomes, including arrests, convictions, incarceration, self-reported crime, and school crime. Studies report significant reductions in criminal involvement as beneficiaries reach adulthood. The evidence highlights that a substantial share of the monetized returns from these interventions comes from persistent reductions in crime. As summarized in Table 1, among the 16 studies reviewed in this category, 69% find reductions in non-violent crime and the same proportion in violent crime, 25% report reductions in incarceration and the same proportion in school-related crime. The only study reporting increases in crime associated with these programs attributes those effects to the very low quality of the services provided.

Overall, the findings indicate that these investments are highly cost-effective and generate substantial long-term returns. Although many studies report improvements in education, employment, and earnings among beneficiaries, and even among subsequent generations, two findings stand out. First, a significant share of the economic benefits generated by these programs stems from their effects on crime reduction. Second, these effects are not explained solely by greater human capital accumulation; in many cases, they arise primarily from improvements in non-cognitive skills, such as greater self-regulation and reduced impulsive behavior.

Head Start (HS) is one of the most extensively studied early childhood programs in the literature.[9] Garces *et al*. (2002) were among the first to analyze its long-term effects, contributing to the literature by presenting evidence on education, income, and crime using a quasi-experimental design. The study uses data from the Panel Study of Income Dynamics (PSID) and applies a household fixed-effects model that compares siblings who did and did not participate in HS, controlling for unobserved family characteristics. The study cohort includes children born between 1965 and 1977 who would have participated in the program between 1968 and 1980, with adult outcomes observed between ages 22 and 34, in 1999. The authors find positive effects on the probability of completing secondary school, attending tertiary education, and earning higher incomes in adulthood, particularly among White males. For African Americans, the study finds a statistically significant 12-percentage-point reduction in the self-reported probability of having been tried or found guilty of an offense. Given that the average rate of having experienced problems with the law in the overall sample is about 15%, this effect is equivalent to a relative reduction of approximately 80%, although the specific baseline rate for African Americans is not reported. The study includes no cost–benefit estimates or formal analysis of mechanisms, although it suggests that the effects could operate through human capital accumulation or spillovers between siblings.

Deming (2009) estimates the long-term effects of HS on more recent cohorts of children who attended the program between 1984 and 1990. Like Garces *et al*. (2002), he uses a sibling comparison strategy with family fixed effects to mitigate selection bias arising from unobserved household characteristics. Using data from the Children of the National Longitudinal Survey of Youth

[9] The program was established in the United States in 1965 as part of the "War on Poverty" to improve the development of vulnerable children before school entry. Eligibility is determined primarily by family income, based on poverty-related thresholds, although in practice it also depends on household characteristics and administrative rules that may vary by year, state, and local agency (e.g., family composition and other conditions). Unlike purely academic preschool programs, HS adopts a comprehensive approach to child development, combining educational services with health, nutrition, and support for parents or caregivers. Services are typically provided during the nine months of the school year, in part-time or full-time sessions. Since its inception, HS has operated on a large scale, serving 561,000 children in 1965, 400,000 in 1971, and more than 800,000 in 1999. Although substantial in absolute terms, its costs have consistently been lower than those of other intensive early childhood programs, with estimates ranging from US$7,000 to US$9,000 per child-year in more recent cohorts. Other studies suggest lower costs. For example, Johnson and Jackson (2019) and Garces *et al*. (2002) estimate costs of US$4,000–US$5,500 per low-income 4-year-old at the county level. The difference arises mainly because some figures are expressed per participant (and/or reflect more recent years with higher real spending and different standards), while others are expressed per low-income child in the area or as measures of program availability or coverage.

1979 (NLSY79) for 1986–2004, the author constructs standardized indices summarizing outcomes throughout the life cycle, including cognitive test scores, educational trajectories, and young adult outcomes such as secondary school graduation, access to higher education, not being in employment, education, or training (NEET), health, adolescent parenthood, and crime. He finds that the young adult outcomes index is 0.23 standard deviations higher for HS participants than for their nonparticipating siblings, with a larger effect among the most vulnerable children (0.28 standard deviations). When disaggregating outcomes, he finds improvements in cognitive test scores of approximately 0.15 standard deviations at ages 5–6 and shows that these effects dissipate by ages 11–14, particularly among African American children.

Despite this, the author finds that long-term effects persist and appear to be driven by improvements in educational trajectories and the transition to adulthood, including less grade repetition, a higher probability of secondary school graduation, and a lower probability of inactivity. This is consistent with a mechanism whereby the program affects skills and behaviors relevant to educational progress and initial labor-market entry, even when cognitive test score differences diminish or disappear. In contrast, he finds no statistically significant effects on the crime indicator, measured using self-reported data, even among vulnerable populations. Deming (2009) recommends caution in interpreting this result, given potential measurement error in the data and the fact that evaluations of intensive programs such as Perry identify crime-related benefits more clearly at older ages and through administrative records (e.g., Belfield *et al*. 2006). Finally, he suggests that, at a cost of approximately US$7,000 per child-year, HS could generate benefits equivalent to a substantial share of Perry's returns—approximately 80%—at a considerably lower cost.

Carneiro and Ginja (2014) complement the evidence on HS by analyzing medium-term effects on children born between 1977 and 1996 who attended the program during the 1980s and early 1990s. Although they use the same data as Deming (2009), the Children of the NLSY79, their identification strategy is based on an RD design that exploits eligibility cutoffs defined by family income relative to the poverty line. The authors examine effects on health, education, and behavioral indicators at different ages. For children aged 12–13, they analyze grade repetition, obesity, and behavioral problems measured using the Behavior Problems Index (BPI); for adolescents aged 16–17, depressive symptoms, obesity, and involvement in criminal activities; and for young adults aged 20–21, secondary school graduation, pregnancy, arrests, NEET status, college attendance, and work experience. Two aspects are central to interpreting the results. First, the first stage shows that income eligibility at age 4 significantly increases the probability of HS participation among males but not females, implying that effects identified through this strategy should be interpreted as local effects for males. Second, the authors analyze what alternative preschool or childcare arrangements would have been used in the absence of HS. They find that, among eligible individuals from younger cohorts, HS participation reduces the probability of attending other preschool programs, while among males from older cohorts, it reduces the probability of participating in informal childcare arrangements.

Consistent with the absence of a first-stage discontinuity, no significant effects are found for females. For males, by contrast, access to HS significantly reduces behavioral problems, measured by the BPI, among those aged 12–13, as well as the probability of being overweight. Among males aged 16–17, the reduction in the probability of being overweight persists, and a reduction in the probability of experiencing depressive symptoms is observed. Finally, among males aged 20–21, the program reduces the probability of having been convicted of an offense or sentenced to prison or a correctional facility by 11.4 percentage points. Relative to a control group mean of 28.4%, this represents a 40% reduction. The estimated effect of participation, instrumented by eligibility,

suggests a reduction of approximately 22% in the probability of having been sentenced among compliers. NEET status falls by 9 percentage points from a mean of 11.2%, equivalent to a relative reduction of approximately 80%. The study does not examine the mechanisms in depth, although it presents preliminary analyses of parental investment and involvement at home, without identifying clear patterns that explain the effects. In an appendix, the authors present a simplified cost–benefit analysis estimating an internal rate of return (IRR) of at least 4%, which they note is higher than the return on alternative investments, such as long-term U.S. Treasury bonds.

Johnson and Jackson (2019) complement the evidence on HS by evaluating whether early childhood investment is complementary to subsequent investment in kindergarten through grade 12 (K–12) public education and whether this complementarity can justify a joint allocation of spending on efficiency, as well as equity, grounds. To identify causal effects, they exploit two independent sources of exogenous variation: (i) the geographic and temporal expansion of HS, using an indicator of the presence of an HS center in the county when a child was aged 4 as an instrument for spending per low-income 4-year-old; and (ii) court-ordered school finance reforms that exogenously changed per-pupil spending in K–12 public schools. Using georeferenced data from the PSID for 1968–2015, they follow cohorts born between 1950 and 1976 and link their childhood place of residence to HS spending at age 4 and average K–12 spending between ages 5 and 17. Regressions for both policy measures include socio-economic controls and household fixed effects, allowing comparisons of siblings differentially exposed to changes in public spending within the same household.

The results show significant long-term effects and robust evidence of dynamic complementarity, concentrated among lower-income children, defined as those in the bottom quartile of parental income. Overall, access to HS and higher levels of K–12 education spending improve multiple adult outcomes, including education, income, and poverty status, although these effects are heterogeneous and concentrated primarily among the most vulnerable populations. The clearest evidence regarding crime concerns incarceration. On average, access to a typical HS center reduces the probability of adult incarceration by 2.5 percentage points among low-income children. This effect increases to 4.7 percentage points when HS access is combined with a 10% increase in K–12 education spending, suggesting strong complementarity between early and sustained investments. When evaluating the marginal return to K–12 spending, the authors again find that effects on crime are larger when this spending is preceded by HS access. Among low-income children, a 10% increase in school spending reduces the probability of incarceration by 5.9 percentage points without HS access, compared with 8.1 percentage points with HS access. Among children who are not from low-income households, by contrast, HS shows no detectable effects or evidence of interaction with school spending, although greater K–12 resources improve their educational attainment and adult earnings and reduce their likelihood of adult poverty.

The authors caution that the estimated effects should not be mechanically extrapolated to current cohorts. Both early childhood investment and the availability of services for young children are now higher than for cohorts born in the 1960s and 1970s, potentially reducing marginal effects. Similarly, current K–12 spending levels are higher, so contemporary effects could be smaller if such spending exhibits diminishing marginal returns. Nevertheless, the central policy message remains: sustained investments throughout the development cycle may generate higher returns than short-duration interventions that are not accompanied by subsequent investments. Regarding mechanisms, the authors interpret this complementarity as consistent with the skill formation framework of Cunha and Heckman (2007), in which “skills beget skills” and early investments increase the productivity of later investments. In their framework, the main channel is direct: by improving the school readiness of low-income children, HS increases the effectiveness of subsequent K–12 spending on learning and

human capital accumulation. The authors also discuss indirect channels, such as peer spillovers and adjustments within the school system (e.g., changes in teaching practices or resource reallocation), but find little evidence supporting them.

Finally, regarding costs and relative efficiency, the authors note that, during the period analyzed, a 10% increase in per-pupil K–12 spending was equivalent to approximately US$480 in additional spending per student per year. Expressed in present value over the entire school trajectory, this amount rises to approximately US$4,300, a figure very close to the average cost of HS, estimated at US$4,230 per low-income 4-year-old. Based on this comparison, they conclude that the relative efficiency of investing equivalent amounts in HS and K–12 education depends on the context, particularly the local poverty rate and initial level of school spending. The results suggest that, in the presence of complementarities, reallocating part of marginal spending toward HS may be more efficient in contexts where K–12 spending is already above average. By contrast, in areas with lower school funding, increasing K–12 spending should take priority. Specifically, they report that in districts with K–12 spending of approximately US$4,500 per pupil, one dollar invested in HS can generate 1.5–2.5 times the improvement in adult outcomes generated by the same dollar invested in K–12 education.

Anders *et al*. (2023) extend the existing evidence by analyzing more recent cohorts and using long-term administrative records linking HS data to criminal justice system records. Their empirical strategy uses an IV based on historical access to the HS program.[10] In this context, the authors highlight two main contributions. First, they use administrative measures of crime based on criminal conviction records from North Carolina. Second, they examine large-scale programs implemented in more recent periods and with different institutional characteristics from those of classic interventions. Specifically, they study the effects of the expansion of HS following its introduction in the 1960s and 1970s and of Smart Start (SS), a state program established in 1992 to improve school readiness through childcare subsidies. Unlike HS, SS does not provide services directly but funds community programs that do. Methodologically, they exploit the gradual implementation of both programs and combine this variation with administrative crime data for 1972–2018, estimating models at the birth-cohort and county levels.

The authors find that both programs significantly reduce the probability of being convicted of a felony, with effects concentrated in counties with higher poverty rates and, in the case of SS, particularly among African Americans. Specifically, they estimate that HS reduces the felony conviction rate at age 35 by 1.3 percentage points in low-income counties, equivalent to a reduction of approximately 20%–25%. For SS, exposure equivalent to approximately US$1,000 per child during the first years of life reduces the same outcome by approximately 0.6 percentage points by age 24, or approximately 12%, with larger effects in poorer communities and among non-White youth. Additionally, they show that SS effects are smaller in counties that had already received HS, which they interpret as evidence of diminishing marginal returns when new investments overlap with an existing foundation of early childhood programs.

Regarding mechanisms, the authors conclude that cognitive and educational channels explain only a small fraction of the reduction in crime, suggesting that the effects operate primarily through non-cognitive skills and behavioral changes. Their cost–benefit analyses also show that savings

[10] The authors note, for example, that in the case of the Perry Preschool program, the original sample included only 123 children. For the evidence even from Head Start, they note that most studies used sibling designs and data from the CNLSY, with crime measured by self-report or incarceration, with the exception of Johnson and Jackson (2018), who use the PSID. For the Abecedarian program, they also highlight that Campbell *et al*. (2012), Anderson (2008) and García and Heckman (2019) do not find robust effects on crime.

associated with crime reduction cover a substantial share of the initial investments and, in the poorest counties, essentially offset the entire cost of the program. In policy terms, this suggests that early childhood programs can partially finance themselves through crime-reduction benefits, that their returns depend critically on the development of non-cognitive skills, and that targeting the most vulnerable populations may be efficient, while accounting for the possibility of diminishing returns as similar programs accumulate.

Campbell *et al*. (2012) analyze the long-term impact of the Abecedarian Project, an early childhood program that was more intensive and placed greater emphasis on academic development than the other programs reviewed. The study is based on a randomized experiment initiated in 1972 with children selected according to a risk index. The final sample included 111 children from 101 families, of whom 57 were assigned to the treatment group and 54 to the control group. The intervention began when children were approximately 4 months old, on average, and continued until age 5 through a year-round, full-time childcare center offering age-appropriate, structured activities to develop language, cognitive skills, and socio-emotional skills. At age 5, a second randomization assigned some children to three additional years of support between kindergarten and second grade.

The authors show that the program generated sustained improvements in educational attainment and find that, at age 30, participants have a substantially higher probability of having graduated from university and have completed more years of schooling. They also observe evidence of better labor-market integration and lower dependence on public assistance. In contrast, they find no effects on self-reported measures of involvement in the criminal justice system, including convictions for misdemeanors or felonies, or on incarceration, whose prevalence is approximately 27% in both the treatment and control groups. The article does not present a formal analysis of mechanisms, but the authors suggest that, as a predominantly academic program with limited emphasis on working with parents or within the home, it may not have substantially influenced the socio-emotional and behavioral factors that appear more directly associated with reductions in crime in other programs.

Two seminal studies evaluate the long-term effects of the Perry Preschool Program and the mechanisms underlying them (Heckman *et al*. 2010; Heckman *et al*. 2013).[11] Heckman *et al*. (2010) document substantial and persistent effects on education, employment, and income and, particularly, on crime among both males and females. The effects on crime are especially pronounced. For males, the total number of arrests at age 27 falls by 40%; at age 40, total adult arrests decrease by approximately 37%, arrests for misdemeanors by 37%, and arrests for felonies by 27%. For females, at age 40, arrests for misdemeanors fall by 36%, arrests for felonies by 42%, and arrests for violent crimes by 38%. Based on these findings, the authors estimate private and social IRRs of 6%–10% annually in real terms and conclude that the benefits, driven by higher labor earnings and especially substantial reductions in the social costs of crime, far outweigh the fiscal costs of the intervention.

Heckman *et al*. (2013) revisit the same program but examine the mechanisms underlying its long-term effects in greater depth and introduce several methodological innovations. First, they use a

[11] Originally, the program was known as the Cognitive Oriented Curriculum because of its systematic emphasis on children's cognitive development and was later renamed HighScope. Perry was a randomized experiment implemented in the Ypsilanti school district in Michigan, targeting African American children aged 3–4 with low IQ scores and high levels of vulnerability in terms of parental income and education. The total sample included 123 children, of whom 58 were assigned to the treatment group and 65 to the control group. The intervention consisted of two years of preschool, with 2.5 hours of instruction per day, five days a week, following an active learning model. Under this model, teachers acted as partners in the learning process and promoted skills related to planning, executing, and evaluating activities, as well as social skills such as cooperation, conflict resolution, self-control, and sociability. Additionally, teachers conducted weekly 1.5-hour home visits to support mothers and caregivers in promoting children's socio-emotional development.

broader and more detailed dataset covering adults at age 40, including administrative records of arrests and convictions, self-reported crime measures, and a wide range of educational, labor-market, and health outcomes. Second, they develop a comprehensive factor model that decomposes the program's effects into components attributable to cognitive skills (IQ) and non-cognitive skills (socio-emotional skills, measured through a factor derived from multiple indicators). Third, they conduct an analysis by sex, revealing markedly different patterns of effects between males and females. The central finding regarding mechanisms is that cognitive improvements, although evident at early ages, do not explain the program's sustained long-term effects. According to their decomposition, approximately two-thirds of the program's benefits for outcomes such as employment, income, educational attainment, and crime are attributable to improvements in non-cognitive or socio-emotional skills, particularly self-regulation, planning, persistence, and responses to social norms.

Their results indicate that the most important mechanism is the externalizing behavior channel. For males, this factor explains 20%–60% of the long-term effects on criminal activity, labor-market outcomes, and health. For females, it accounts for 40%–60% of the observed effects. The academic motivation channel helps explain improvements in standardized test scores, while, for females, the cognitive skills channel explains part of the effects on educational attainment and marriage outcomes.

Furthermore, the authors show that, among the three mechanisms examined, externalizing behavior is the most malleable and the most strongly affected by participation in the Perry Preschool Program. They therefore conclude that a central reason the program generates such high returns is its ability to reduce problematic behaviors and, consequently, criminal involvement over the life course.

Schweinhart (2013) analyzes the long-term effects of the Perry Preschool Program using measures of arrest and incarceration and conducts a cost–benefit analysis. Program participants are significantly less likely to engage in criminal activity during adulthood, exhibiting lower rates of arrest, conviction, and imprisonment. For example, the share of individuals with five or more lifetime arrests declines by 19 percentage points—from 55% in the control group to 36% in the treatment group—while the probability of ever being sentenced to jail or prison falls by 24 percentage points, from 52% to 28%.

The program generates substantial reductions in arrests for property and drug-related offenses among males and for violent and property offenses among females. The author emphasizes that many of the crimes most affected by the intervention, including assault, offenses involving personal injury, and theft, are commonly associated with poor self-control and a limited ability to anticipate future consequences. This pattern is consistent with the interpretation that the program strengthened important non-cognitive skills, such as self-control, responsibility, and planning ability.

To formalize the mechanisms linking the program to reduced criminal behavior, the author develops a structural model that combines cognitive development, school engagement, and educational trajectories. In the model, early childhood intervention improves cognitive development and raises IQ. Higher cognitive ability subsequently strengthens motivation during primary school. Greater motivation and stronger academic performance reduce placement in special education, improve achievement throughout primary and secondary school, and ultimately increase educational attainment and legitimate economic opportunities. This sequence reduces criminal involvement later in life.

The cost–benefit analysis concludes that, in 2013 U.S. dollars and using a 3% discount rate, the program generates benefits of US$341,732 per participant compared with a cost of US$20,019, implying a benefit–cost ratio of approximately 17:1. Approximately 80% of these returns accrue as social benefits, and within this category, nearly 88% stem from savings associated with crime reduction, reinforcing the view of the Perry Preschool Program as a highly cost-effective intervention for crime prevention.

Reynolds *et al.* (2001) and Reynolds *et al.* (2011) evaluate the long-term effects of the Chicago Child-Parent Center Program (CPC).[12] The authors argue that the program's main contribution, relative to small experimental interventions such as Perry Preschool or the Abecedarian Project, is that it allows researchers to assess whether this type of intervention can generate meaningful effects under real-world, large-scale conditions within the public school system.

Reynolds *et al.* (2001) find that CPC participants were more likely to graduate from high school and less likely to engage in juvenile crime. In particular, the probability of having at least one arrest between ages 10 and 18 fell from 25.1% to 16.9%, driven largely by reductions in arrests for violent offenses, which declined from 15.3% to 9.0%.[13] Effects among participants who received only the elementary school component were marginal or nonexistent. Although the study did not conduct a formal analysis of mechanisms, the authors suggest that the observed effects may operate through improvements in early cognitive skills, greater early academic success, and a reduced need for remedial education services. Reynolds *et al.* (2011) extend the analysis of effects through age 28, incorporating a broader set of outcome measures and a formal examination of underlying mechanisms. They find that participation in the program increases the probability of graduating from high school, attending a four-year postsecondary education program, and achieving higher socio-economic status by age 30. In addition, the program increases the probability of having health insurance and reduces the probability of substance abuse. Regarding crime, the authors document reductions in the probability of ever being arrested, from 54.3% to 47.9%; the probability of facing felony charges, from 24.6% to 19.3%; and the probability of having been incarcerated in prison or jail, from 21.1% to 15.2%. The authors argue that these effects are explained by improvements in cognitive development at age 5, greater parental involvement, and enhanced early educational support, which subsequently translate into better socio-emotional adjustment, attendance at higher-quality schools, fewer behavioral problems, and more stable educational trajectories. They also conclude that the largest benefits are concentrated among children who participated in the preschool component and that extending program duration beyond a certain threshold does not generate proportional gains, which they interpret as evidence of diminishing marginal returns.

Gray-Lobe *et al.* (2023) present the first study to evaluate the long-term effects of a large-scale early childhood education program using a lottery-based quasi-experimental assignment mechanism.[14]

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[12] The CPC is the oldest public early childhood education program in the United States after HS. The program provides education and continuous support to disadvantaged children in Chicago from age 3 through second or third grade. It combines structured instruction in language and mathematics, delivered by well-trained teachers, with family support components, including parent programs, home visits, medical screenings, and access to specialized services such as speech therapy. According to the authors, the preschool component cost approximately US$4,350 per child in 1996.

[13] They followed 1,539 children from the 1980 birth cohort who attended preschool between 1985 and 1986 as part of the Chicago Longitudinal Study. The sample included 989 children who participated in the CPC program, 374 matched comparison children who attended traditional kindergarten programs, and 176 children who attended CPC centers only during kindergarten but not preschool, allowing the authors to examine differences by duration of exposure.

[14] Identification uses a lottery-based random assignment conducted in 2003 and 2004 among children who applied and were not guaranteed admission. The main outcomes are analyzed when participants reach approximately 20 to 23 years of age, using administrative data from educational, criminal and income records in Massachusetts and national tax records. The admission offer is a valid instrument for actual attendance in a BPS preschool, as receiving an offer increases the probability of enrollment by 65 percentage points. The analysis is based on more than 4,000 applicants from seven cohorts between 1997 and 2003. During this period, K1 teachers met certification

They estimate the effect of attending public preschool at age 4 in the Boston Public Schools (BPS) prekindergarten program (Boston PreK), where places are allocated by lottery whenever demand exceeds available capacity. Unlike Perry and Abecedarian, this is a large-scale program administered by the public school system.

The program has significant positive effects on academic achievement and long-term educational trajectories.[15] Regarding crime and disciplinary outcomes, no effects are observed during middle school (grades 6–8), whether measured through suspensions, absenteeism, or indicators of juvenile incarceration. In high school (grades 9–12), however, preschool attendance reduces the number of suspensions by 0.24 from a baseline of 0.66, equivalent to an approximately 36% reduction, and decreases the probability of juvenile incarceration by 1 percentage point, although only 0.7% of applicants not offered a place are ever incarcerated. In addition, the disciplinary behavior index improves by 0.17 standard deviations. Finally, although the authors motivate their analysis of disciplinary outcomes by noting that preschool programs may generate important non-cognitive benefits, they do not formally examine the mechanisms underlying these effects or conduct a formal cost–benefit analysis.

Intergenerational Effects

To conclude the discussion of early childhood programs, two studies analyze their intergenerational effects. Barr and Gibbs (2022) examine whether early childhood investment can interrupt the intergenerational transmission of poverty by improving educational attainment and labor-market outcomes and reducing risky behaviors in adulthood among the second generation.[16] Maternal access to HS is associated with a 6%–11% increase in discounted earnings for the second generation, an 8-percentage-point reduction in teenage parenthood, an 11-percentage-point increase in high school graduation, and an 18-percentage-point increase in postsecondary enrollment. Regarding crime, the authors find a 13-percentage-point reduction in criminal involvement among the second generation, equivalent to a decline of approximately 44% relative to a mean of 28.3%. This reduction is substantially larger among males, reaching 22.9 percentage points, while effects among females are small or imprecisely estimated. Effects are also smaller among families in which the maternal grandmother completed high school.

Regarding mechanisms, the authors document improvements in the home environment and parenting practices, measured by the Home Observation for Measurement of the Environment (HOME) Index, as well as a 21% increase in the probability that children attend early childhood education programs, including HS. They also observe improvements in educational and behavioral

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requirements comparable to those of teachers in higher grades, all held bachelor's degrees, and 56% had master's degrees. Class sizes ranged from 10 to 25 full-time students, and the program cost approximately US$13,000 per child-year in 2020 dollars. The authors emphasize that the relevant counterfactual for these children is not the absence of preschool, but rather attendance at other preschool programs, including private centers and Head Start.

[15] Including postsecondary enrollment, high school graduation, and taking the Scholastic Aptitude Test (SAT), the high school exit examination commonly used for college admissions. However, the authors find no effects on standardized test scores in grades 3 and 10. Juvenile incarceration in the study is measured through records of incarceration or attendance at a facility operated by the Department of Youth Services.

[16] To do so, they link information from women in the NLSY79 with data on their children observed in adulthood through the Children and Young Adults of the National Longitudinal Survey of Youth (CNLSY) as of 2016. Their identification strategy exploits variation in the availability of Head Start in the mother's county of birth when she was four or five years old, measured using program funding and support for grant application development. Because exposure is defined by program availability rather than individual participation, the authors interpret their estimates as intent-to-treat (ITT) effects, capturing both direct impacts and potential spillovers or broader environmental changes induced by the program. They also approximate program eligibility by distinguishing between households with higher and lower levels of disadvantage based on the educational attainment of the maternal grandmother. The impacts are concentrated among the most disadvantaged group.

trajectories among the second generation. The probability of grade repetition declines, and the probability of criminal involvement before age 18 falls by 5.7 percentage points, which, relative to a baseline of 9.7%, represents a reduction of approximately 59%. Although the study does not include a formal cost–benefit analysis, the authors conclude that early childhood investments can generate persistent benefits that extend to the next generation. Consequently, they argue that traditional cost–benefit analyses of HS likely underestimate the program's social returns because they do not account for these intergenerational effects.

The second study evaluating intergenerational effects is García *et al*. (2023), who examine outcomes among individuals who participated in the Perry Preschool experiment at age 54, as well as effects on their children, who were approximately 28 years old. Using survey data and administrative crime records, they find that the children of individuals assigned to the treatment group grew up in more stable households, with a greater probability of living with two parents. These parents earned higher incomes, engaged less frequently in criminal activity, and, at age 54, exhibited better cognitive and socio-emotional skills and health outcomes.

These improvements in the first generation translated into substantial benefits for the second generation. The probability of school suspension declines, while the probability of being in good health and employed increases, and the probability of divorce decreases. Regarding crime, the probability of being arrested in early adulthood falls by approximately 18 percentage points among children of males who originally participated in the program.

Methodologically, the authors exploit the original experimental assignment but carefully adjust for imperfect randomization, small sample size, and attrition using augmented inverse probability weighting (AIPW) estimators, permutation tests, bootstrap procedures, and Lee bounds. Through a mediation analysis, they decompose the effects into four channels: fertility, parenting practices, parental education and employment, and parental crime. They find that improvements in household environment and stability, together with reductions in parental involvement in crime, explain nearly 50% of the average intergenerational effect on outcomes for which positive effects are observed, particularly school suspension, arrest, good health, high school graduation, and employment. By contrast, parental education, employment, and fertility play more limited roles.

Finally, the authors note that previous studies estimate the social IRR of the Perry Preschool Program at 8.9%, a figure that does not fully incorporate intergenerational effects. Their findings therefore suggest that the program's benefits, particularly those related to crime reduction, employment, and health among the second generation, further strengthen the case for intensive early childhood interventions targeting highly vulnerable populations.

Brutti and Montolio (2021) present one of the few studies that causally analyze the effects of early childhood programs on crime outside the United States. They provide evidence from a large-scale preschool expansion implemented in Spain in the early 1990s that, unlike many of the programs examined in the preceding literature, did not exclusively target vulnerable populations. Moreover, because the reform affected more recent cohorts, its findings offer valuable evidence for contexts such as Latin America, where similar interventions have expanded in recent decades. The authors use administrative police records from Catalonia covering 2009–14 to construct crime rates for individuals aged 15–30. Their identification strategy exploits the gradual expansion of the reform across periods and regions, which lowered the preschool entry age to include children aged 3. They argue that this variation was exogenous and largely driven by the autonomy of the implementing regions, allowing preschool coverage at that age to increase from approximately 5% to 65% between 1987 and 2000.

The results indicate that a 1-percentage-point increase in preschool coverage among children aged 0–3 in the early 1990s generated a 1.6% reduction in crimes committed during 2009–14. Although this effect is smaller than those reported in some of the studies discussed previously, the authors emphasize that the cost–benefit estimates remain positive and, in some respects, even more favorable. While they do not directly analyze the underlying mechanisms, they find that the largest reductions occur in drug-related offenses, followed by violent crimes and offenses involving violations of social conduct norms, with no significant effects on economic crimes, property crimes, or fraud. The authors interpret this pattern as evidence consistent with improvements in non-cognitive skills, impulse control, and decision-making. Finally, considering only the economic benefits arising from crime reduction, they conclude that the expansion was highly cost-effective. Increasing coverage among children aged 0–3 by 1 percentage point would cost approximately €26.8 million, while savings generated through crime reduction would amount to €113.9 million, implying a benefit–cost ratio of at least 4:1.

The final study included in this category is Baker *et al*. (2019), who analyze the long-term effects of the universal childcare program introduced in Quebec in 1997. The policy provided regulated childcare places for children aged 0–4 at a very low cost of approximately C$5 per day, with the remaining cost subsidized by the government. This price reduction increased the probability of attending formal childcare by approximately 15 percentage points among the earliest eligible cohorts, eventually reaching increases of more than 40 percentage points among later cohorts. Using a DiD strategy that compares eligible and ineligible cohorts in Quebec with those in the rest of Canada, the authors show that early exposure to the program led to deterioration in socio-emotional skills, including increased anxiety and aggression, and that these effects persisted or even intensified between ages 5 and 9.

During adolescence and early adulthood, exposure to the program is associated with poorer self-reported health, lower life satisfaction, and higher levels of juvenile criminal involvement. In their most comprehensive specification, the authors estimate that the policy increased criminal charges by 353 cases per 100,000 youth, equivalent to approximately 19% above the mean, while the percentage increase in convictions was slightly larger. The strongest effects are observed for property crimes, with an additional 602 charges and 342 convictions per 100,000 youth, representing increases of 19% and 25% relative to the corresponding means. These effects are larger among males. Regarding mechanisms, the authors argue that the results are mainly explained by deterioration in non-cognitive skills resulting from exposure to a lower-quality childcare environment. Their findings suggest that, just as high-quality early childhood interventions can reduce criminal behavior through improvements in socio-emotional development, universal expansion without rigorous quality standards may generate persistent adverse effects on well-being and criminal involvement.

2.5. Optimal Starting Age: Policies on School-Entry Age

Studies analyzing the effects of legislation establishing the minimum age for school entry have primarily focused on academic and labor-market outcomes. However, an emerging body of research examines the consequences of these policies for crime. This line of research is closely connected to the literatures on compulsory schooling and early childhood education, as it is based on the premise that relative age at school entry can influence cognitive and socio-emotional development, academic performance, and, consequently, subsequent criminal behavior. This review treats these

policies as a separate category because they affect not only educational attainment but also learning and human capital accumulation through the age at which formal education begins.[17]

This review identifies four studies that causally estimate the effects of these rules on criminal involvement. Three employ RD designs, while one uses a DiD approach. As shown in Table 1, 75% of the studies report reductions in non-violent crime, representing all studies that examine this outcome. In addition, 25% report reductions in incarceration, and 25% document reductions in school-related crime; in both cases, these findings come from the only study examining each outcome. In contrast, the findings for violent crime are mixed. One study reports reductions in violent crime, another finds increases, and the remaining two do not examine this outcome.

The pioneering study is Cook and Kang (2016), who examine North Carolina by combining administrative records on exact dates of birth, school enrollment, standardized test scores, juvenile delinquency, and adult crime. The identification strategy exploits the kindergarten entry eligibility cutoff based on date of birth, which generates discontinuous differences in relative age at school entry and, in conjunction with the minimum legal school-leaving age of 16, changes the probability of dropping out. They find that students who enter school at a relatively older age exhibit better academic outcomes during compulsory schooling.[18]

Regarding criminal behavior, the study finds heterogeneous effects across ages. Between ages 13 and 15, students who enter school at a relatively older age are less likely to engage in delinquent behavior. The rate of juvenile complaints[19] declines by 2.8 percentage points from a mean of 8.8%, equivalent to an approximately 32% reduction. The effect reverses in late adolescence and early adulthood, when the probability of conviction for a serious offense increases. For offenses committed between ages 17 and 19, the increase is 0.8 percentage points, which, relative to a mean of 5.68%, represents an increase of approximately 14%. These effects are concentrated at age 19. The effects are more pronounced among youth from disadvantaged households, particularly those whose mothers were unmarried or had low levels of education (less than a high school diploma), suggesting an important interaction between school-entry-age rules and socio-economic background.

The authors interpret these results through two complementary mechanisms. First, better academic performance associated with older school-entry age reduces juvenile delinquency. The lower probability of criminal involvement during adolescence may be explained by greater academic engagement and a lower probability of school failure. Second, students who enter school at an older age also tend to leave school earlier in their educational trajectories because they reach the legal school-leaving age in a lower grade, increasing their exposure to criminogenic environments during

[17] Generally, regulations establish a minimum age for entry into formal schooling, whether at the kindergarten or transition/prekindergarten level. Previous studies, such as Angrist and Krueger (1991) and subsequent research, have exploited variation in birth dates relative to enrollment cutoffs to estimate effects on educational attainment and labor-market outcomes. These studies have found that entering school later—that is, being relatively older within a grade cohort—can be associated with better academic performance, consistent with greater socio-emotional and cognitive maturity. However, when legislation combines (a) an age-based school-entry rule with (b) a minimum legal school-leaving age, entering later may also increase the risk of dropping out. Students reach the legal school-leaving age while enrolled in lower grades, thereby increasing the period during which they can leave school before completing secondary education.

[18] For example, grade repetition falls by 6.2 percentage points, and the probability of ranking in the bottom quartile of sixth-grade test scores declines from 29% to 23%. However, these benefits disappear beyond a certain age, as school dropout before graduation increases. The probability of being enrolled in the final year of high school decreases by 3.14 percentage points relative to a mean of 87%, consistent with a greater opportunity to leave school upon reaching the legal school-leaving age while still enrolled in lower grades.

[19] A juvenile complaint refers to a report filed by a police officer, teacher, or citizen against a young person suspected of committing a crime or delinquent act. It constitutes the first step in the juvenile justice system. After reviewing the complaint and available evidence, a counselor from the North Carolina Division of Juvenile Justice and Delinquency Prevention (NCDJJDP) determines whether the case should be referred to court and, if necessary, connects the youth with additional services or support.

early adulthood. This trade-off between juvenile incapacitation and earlier school exit explains the reversal of the effect across ages. The authors estimate that school dropout accounts for approximately 82% of the increase in criminal behavior in early adulthood and provide temporal evidence consistent with the hypothesis that dropping out precedes criminal activity, as the increase in offending occurs primarily at age 19, when the affected individuals have already left school. Finally, the study does not present a formal cost–benefit analysis.

Depew and Eren (2016) exploit the school-entry eligibility rule in Louisiana, United States, to analyze criminal offenses committed through age 17, noting that most of these incidents are concentrated between ages 15 and 17.[20] The results show that later school entry reduces the probability of juvenile criminal involvement among Black females, with effects particularly concentrated in high-crime districts. On average, the probability of engaging in any juvenile crime declines by approximately 3.5 percentage points for this group, driven primarily by a reduction in non-felony offenses (approximately 2.8 percentage points). Given that the mean juvenile crime rate for Black females is 3.6%, this represents a very large effect, although the authors caution that it applies only to children born near the school-entry cutoff. In high-crime areas, the effect is substantially larger, reaching approximately 7.1 percentage points. In contrast, no effects are found for males.

To explore potential mechanisms, the authors analyze effects on academic performance, measured by standardized tests in English and mathematics in eighth grade. Consistent with the pattern observed for crime, they find that being older at school entry improves test scores, particularly in mathematics and among females. This finding is consistent with a mechanism whereby greater maturity at school entry improves academic performance and, through this channel, reduces involvement in criminal activities. The effects for males are small or not statistically significant. Based on this evidence, the authors interpret their findings as consistent with a human capital accumulation mechanism for females, although they do not estimate a structural model of the underlying channels. From a policy perspective, they emphasize that, because the effects are not widespread and are concentrated within a specific subgroup, the findings do not provide strong support for broadly recommending delayed school entry as a universal policy.

McAdams (2016) complements the evidence from the United States using microdata from the 1960, 1970, and 1980 censuses. Rather than using an RD design around school-entry eligibility cutoffs, as in previous studies, the paper employs a DiD strategy that exploits changes in minimum school-entry-age laws across states and over time, combined with the interaction between birth quarter and state legislation, to identify whether earlier or later school entry affects years of schooling and, ultimately, criminal outcomes. The author argues that the conventional RD design primarily identifies the direct effect of delaying entry for children immediately affected by the cutoff, whereas his approach also identifies an indirect effect associated with changes in the age composition of peer groups, exploiting variation by quarter of birth. The empirical analysis focuses on males aged 18–30. As a first step, using data from the 1960 and 1970 censuses, the study documents that increases in the minimum age required to enter primary school reduce kindergarten attendance, particularly in the public sector, and increase the probability of not attending school, confirming that these laws

[20] The authors use administrative data and exploit an eligibility rule requiring children to turn 5 before September 30 of the school year to enter kindergarten. This cutoff generates variation in relative age within the school year, allowing the application of an RD design. To measure crime, they use administrative records from the juvenile justice system covering 1997–2012, which include youth reported as offenders and sanctioned through either probation or incarceration. The authors emphasize that this measure captures relatively serious offenses compared with self-reported measures or arrest data, which tend to include minor infractions. They also distinguish between violent and non-violent offenses and between felonies and non-felonies.

effectively alter the timing of school entry and supporting their use to examine subsequent effects on crime.

The results indicate that increasing the minimum school-entry age by one month is associated with a 0.065-percentage-point reduction in the probability of incarceration, equivalent to approximately 11% of the average incarceration rate in the sample. However, because individuals are born in different quarters and not all are directly exposed to changes in the cutoff, the author estimates a triple-difference model that separates direct and indirect effects. The results suggest that the indirect effect of increasing the minimum entry age by one month reduces the probability of incarceration by 0.081 percentage points, equivalent to approximately 13% of the sample mean. This finding is consistent with a peer-effects mechanism whereby relatively older classroom cohorts may improve interactions, discipline, or the learning environment, thereby reducing the probability of engaging in criminal behavior.

By contrast, the direct effect, associated with delaying school entry for children directly affected by the rule, increases the probability of incarceration by 0.02 percentage points, suggesting that postponing schooling may impose costs on this subgroup. The author does not formally investigate the mechanisms underlying this result but suggests two possible explanations: affected children may learn less during the additional year spent outside school or, as proposed in previous studies, delayed entry may lead to earlier school dropout. Finally, when examining heterogeneity by race, the study finds that the effects are concentrated among White males, while no statistically significant effects are identified among Black males.

The other study exploiting school-entry-age laws is Landersø *et al*. (2017), which focuses on Denmark. The authors connect two strands of literature: (i) descriptive evidence on the age–crime profile, which documents that involvement in criminal activity increases during adolescence and peaks during the transition to adulthood; and (ii) the literature on school-entry age, which has primarily focused on educational outcomes. Exploiting the Danish cutoff rule—which requires children to turn 7 before January 1 of the school year to enter first grade—the study uses a fuzzy RD/IV design to estimate the causal effect of being older within a grade on criminal behavior. Entry age is defined in months relative to the cutoff, and the study uses Danish administrative records covering individuals born between 1981 and 1993. To measure criminal activity, the authors use administrative records from the Danish criminal justice system and construct age-specific outcomes beginning at the age of criminal responsibility (15). The main outcome is based on criminal charges or accusations rather than convictions alone, broadening coverage and increasing statistical power. In addition, offenses are classified as property crimes, violent crimes, or other crimes, and models are estimated separately by sex.

The main finding is that later school entry—entering one month later—significantly reduces the probability of juvenile criminal involvement, with particularly large effects on property crime among males. Among females, the effect is most evident during adolescence, with a substantial reduction in cumulative offending through the late teenage years.[21] The cumulative probability of having at least one criminal charge by age 18 falls by approximately 1.5 percentage points from a baseline of 5.4%, representing a reduction of nearly 30%. Among males, the reduction extends across a broader age range, continuing into the early twenties. The probability of having a criminal charge at age 18 declines by approximately 4 percentage points, equivalent to a reduction of approximately 21%

[21] The study examines two types of outcomes: (i) the probability of having committed at least one criminal offense at a specific age (between one birthday and the next); and (ii) the cumulative probability of having committed at least one offense at that age or earlier, allowing the authors to examine persistence over time.

relative to a baseline of 19%. This pattern suggests that the age–crime profile depends not only on biological age but also on the timing of schooling and the transition to adulthood, which is altered when school entry is delayed.

An additional finding is that, among males, the authors identify effects on the intensive margin. Criminal involvement is not merely shifted to later ages; the cumulative number of charges also declines during part of their twenties, suggesting a more persistent reduction in criminal activity over the life course, particularly in property crimes committed at younger ages. Among females, the evidence is concentrated primarily on the extensive margin and on violent offenses at younger ages, with less precise estimates at older ages.

The authors attribute the effects mainly to an incapacitation mechanism: later school entry postpones school exit, reducing the time spent outside the educational system during adolescence.[22] The study also documents effects on human capital accumulation, including improvements in academic performance (particularly in mathematics), greater sorting of females into more competitive fields of study (such as medicine), and slightly longer educational trajectories among males. The authors emphasize that these findings should be interpreted as local effects for compliers around the school-entry-age cutoff. They also note that the heterogeneity of the results suggests smaller returns to delayed school entry among children with more highly educated parents. Therefore, delaying entry into the educational system should not necessarily be viewed as a broadly applicable policy recommendation.

2.6. Beyond the Traditional Curriculum: Programs with Behavioral Components

The importance of non-cognitive skills in crime prevention, as well as in multiple dimensions of individual development, has driven the design of interventions that go beyond the traditional academic curriculum, including extracurricular programs with behavioral components, mentoring, and sports programs. Although these models differ in structure, they share potential mechanisms such as increased time under adult supervision, participation in structured non-academic activities, exposure to prosocial relationships, and, in some cases, the explicit development of socio-emotional skills such as self-control, empathy, decision-making, and conflict resolution. Despite their expansion across different contexts, however, rigorous evidence on their causal effects on juvenile crime remains limited.[23] For this reason, this review focuses on ten studies that rigorously

[22] To investigate the underlying mechanisms, the authors conduct several analyses related to incapacitation effects. When the results are disaggregated by day of the week, the reduction in offending among males is concentrated on weekdays, consistent with more time being occupied by school-related activities. Moreover, when outcomes are aligned by school grade rather than age, the effects tend to lose statistical significance, reinforcing the interpretation that the mechanism operates through the educational calendar rather than through permanent changes in criminal propensity. In addition, after controlling for the average age of classmates to assess peer-age effects, the authors find no evidence that peer age is a relevant channel.

[23] Part of this limitation stems from the difficulty of implementing credible identification strategies, given the diverse forms these interventions take, the heterogeneity of their components, and the specific populations they target. Systematic reviews of extracurricular, mentoring, and sports programs show that many studies lack experimental or quasi-experimental designs, do not measure outcomes directly related to crime, and rarely include cost-effectiveness analyses (Durlak *et al.* 2010; Jekielek *et al.* 2002; Jugl *et al.* 2023). Durlak *et al.* (2010) present a meta-analysis of 75 evaluations of extracurricular programs and find statistically significant effects across multiple dimensions of youth development, including improvements in self-esteem, school bonding, positive social behaviors, standardized test performance, and school grades, as well as reductions in problematic behaviors. No significant effects were found on school attendance or drug use. The review by Jekielek *et al.* (2002) synthesizes evidence from ten mentoring programs for youth, five of which had experimental evaluations. The results suggest positive effects on school attendance, attitudes toward school, relationships with parents and peers, drug and alcohol use, and certain problematic behaviors. Most programs combined mentoring with other components, such as academic support, life skills curricula, or financial support, so it is not always possible to isolate the specific effect of mentoring. The three studies reporting effects on delinquent behavior are included in this review. The systematic review by Jugl *et al.* (2023) identifies 13 evaluations of sports programs aimed at preventing crime or recidivism that used sufficiently rigorous designs to be included in the meta-analysis. The results suggest positive effects on both indicators associated with crime and antisocial behavior and related psychological and socio-emotional factors, including self-esteem, well-being, stress, and depressive symptoms. Only programs targeting youth who had not

evaluate the effects of extracurricular, mentoring, or sports programs on criminal behavior or closely related outcomes. Four studies measure the effects of extracurricular programs with behavioral components, four focus on mentoring programs, and two examine sports programs.

Most of the effects of these programs concern non-violent and violent crime outcomes. As shown in Table 1, 60% of the studies reviewed report significant reductions in non-violent crime, and the same proportion find reductions in violent crime, with only one study documenting an increase in violent crime. Evidence on incarceration and school crime is more limited: 80% of the studies do not examine incarceration, and 50% do not examine school crime. Nevertheless, among all studies reviewed in this category, 20% find reductions in incarceration, and 30% report reductions in school crime, while statistically insignificant effects are reported by 20% of the studies for non-violent crime, 10% for violent crime, and 20% for school crime.

Regarding extracurricular programs with behavioral components, a recent strand of research focuses on programs incorporating cognitive behavioral therapy (CBT), an approach that seeks to identify and modify automatic thoughts and behavioral responses in high-risk situations. Although CBT has a long history of clinical application, its adaptation to school and community settings for juvenile crime prevention is more recent.[24] The review identified only four studies examining this type of intervention and its effects on crime: two in the United States and two in El Salvador. In all cases, these evaluations use experimental or quasi-experimental designs and rely on administrative crime records or validated self-reported measures, providing strong internal validity.

Extracurricular Programs with Behavioral Components

The program with the strongest causal evidence of its effects on juvenile crime is the one evaluated by Heller *et al.* (2013). The authors examine the Becoming a Man (BAM) program, a socio-emotional intervention based on CBT, implemented in 18 public schools in some of Chicago's most violent neighborhoods. They evaluate its effects on arrests and school dropout through a randomized experiment conducted during the 2009–10 school year. Using administrative police records from Illinois, the study estimates that the program reduced arrests for violent crimes by 44% and arrests for other offenses, including weapons possession, vandalism, and school disruption, by 36%. Effects on school dropout were also significant in the short term.[25]

In a subsequent study, Heller *et al.* (2017) again evaluate the effects of CBT-based programs in three different contexts. The first experiment replicates the intervention examined in their earlier research, the second extends it to the following school year with a new cohort in the same schools, and the third tests a variant of the program in a juvenile detention center in Chicago. All three experiments use randomized assignment and administrative crime records to measure outcomes. A central contribution of this study is its detailed analysis of the mechanisms that could explain the observed effects. The authors find no evidence that the effects on crime are mediated by improvements in

previously been convicted are included in this review. Jaitman and Scartascini (2017) review several sport-for-development programs; however, none of the interventions that examine crime-related outcomes were implemented in school settings.

[24] Among interventions targeting adults, two notable examples are a program for young men in highly vulnerable circumstances in Liberia (Blattman *et al.* 2017) and an intervention targeting the general population in Ghana (Barker *et al.* 2022), both of which yielded promising results in reducing violent behavior and improving self-control. Similarly, Bhatt *et al.* (2024) evaluate the impact of READI in Chicago, a program targeting young adults at high risk of involvement in gun violence, all of whom had prior arrests. The intervention combined 18 months of subsidized employment with CBT and support services. Using an experimental design, the authors find significant reductions in arrests for shootings and homicides.

[25] Cook *et al.* (2014) analyze a randomized experiment combining the BAM intervention with an additional intensive mathematics tutoring component, implemented with a different group of students in the same Chicago public schools. Although the authors identify positive effects on various measures of mathematics learning, the program's cost increases substantially (US$3,000–US$6,000 per student), likely because of the individualized academic component. Because the study does not report effects on crime, it was not included in this review.

emotional intelligence, self-control, perseverance, or other measurable non-cognitive traits. This suggests that the mechanism may operate through automatic processes that are difficult to measure directly rather than through deliberate, reflective changes in personality or cognitive skills.

Although evidence from developed countries showed positive effects of extracurricular programs with behavioral components, uncertainty remained about their applicability in Latin America. In this context, Dinarte (2017) and Dinarte-Diaz and Egaña-delSol (2024) provide the first rigorous evidence from El Salvador, based on a single experiment implemented in 2016. They find that extracurricular programs combining socio-emotional learning and greater supervision consistently reduce aggressive behaviors and self-reported crime.

In her first study, Dinarte (2017), motivated by evidence from developed countries on the preventive effects of supervised extracurricular programs, conducts a randomized trial during the 2016 school year in five public schools located in municipalities in El Salvador that were classified as highly violent at the time. The program offered sports, arts, and academic tutoring activities after school hours for 180 minutes per week over approximately six months.[26]

Crime and violence outcomes were measured using self-reported delinquent behaviors, such as theft, assault, and robbery, as well as violent behaviors, including school fights, damage to municipal property, and domestic aggression. Other variables of interest included teachers' reports on student behavior, attendance, and academic performance. The results show significant reductions in delinquent and violent behaviors, along with improvements in school attitudes and behavior, with heterogeneous effects depending on the peer composition of groups assigned within the program. The program reduced delinquency by 0.19 standard deviations and violence by 0.14 standard deviations, improved attitudes toward school by 0.17 standard deviations, reduced absenteeism by 23%, lowered the probability of receiving a disciplinary report by 6.4 percentage points, and reduced the teacher-reported misconduct index by 0.17 standard deviations. In addition, it increased academic grades by 0.11–0.13 standard deviations. Unlike the effects on violence, which proved temporary, these academic gains persisted into the following year.

The study also provides evidence on peer effects and group composition. Based on a prior measure of each student's probability of engaging in violence, students were randomly assigned to groups with higher concentrations of either high-risk or low-risk youth, defined relative to the school average. The results show positive spillover effects on students who were not enrolled in the extracurricular program, affecting both academic outcomes and behavior. An important finding is that assigning students to groups with heterogeneous risk levels enhances the program's benefits, whereas grouping high-risk youth together may be detrimental to students at the margin. In particular, students assigned to groups with lower-risk peers show greater reductions in violent behavior, suggesting that peer composition within the program independently affects outcomes.[27]

Dinarte-Diaz and Egaña-delSol (2024) examine in greater depth the mechanisms underlying the effects documented by Dinarte (2017). To do so, they incorporate a neurophysiological module involving a random sample of 598 students at the end of the intervention, measuring emotional regulation and stress using portable electroencephalograms in a field laboratory setting. The

[26] The intervention involved 1,056 students aged 10–16 in 2016 and consisted of two weekly sessions lasting approximately 90 minutes each. Each session combined a guided discussion aimed at strengthening socio-emotional skills (self-regulation and conflict resolution) with a club-based curriculum (science, arts, sports, and leadership) delivered by volunteers from a nongovernmental organization.
[27] For example, for a student whose initial risk level is close to the median, assignment to a group with a higher proportion of high-risk youth increases violent behavior by 0.18 standard deviations, reduces mathematics performance by 0.15 standard deviations, and raises the probability of failing at least one subject by 4.8 percentage points.

objective was to determine whether improvements in behavior and academic performance occurred through reductions in automatic and impulsive responses and better processing of emotional stimuli. The study also examines how heterogeneity in students' initial risk levels, measured by their baseline probability of engaging in violence, relates to the observed effects. The findings indicate that students with a higher initial propensity for violence account for a larger share of the academic gains, while students with a lower baseline probability of violence contribute more to the behavioral improvements.

The results are consistent with an emotional regulation mechanism. The program reduces the main neurophysiological indicator by 0.35 standard deviations, suggesting less impulsive responses to stressful situations. It also improves students' locus of control, indicating a stronger perception of personal control over outcomes (a 0.25-standard-deviation reduction in the index). Additionally, self-reported measures of violent behavior and gang involvement decline significantly. The authors interpret these findings as evidence that the program operates primarily by improving emotional regulation at the neurophysiological level, thereby reducing automatic aggressive responses in situations of social conflict.[28] In addition, among treated youth, those with higher predicted levels of violence exhibit higher stress levels than comparable untreated peers. This finding reinforces the recommendation to avoid grouping high-risk youth together and instead promote heterogeneous groups, which may reduce tensions and prevent adverse peer effects.

Although the study does not report per-student program costs, the authors suggest that the intervention's low intensity and reliance on volunteers indicate substantial potential for scaling up and a favorable benefit–cost profile in high-risk school settings. Nevertheless, an important question remains unresolved: whether the program's effects persist over the longer term.

Mentoring

The four rigorous studies of mentoring programs included in this review differ in the extent to which they are integrated with schools, but all target school-age youth and report effects on crime or disciplinary outcomes. The programs combine one-on-one mentoring with adults, structured supervision, socio-emotional guidance, and academic or vocational support. More recent studies have also incorporated CBT and trauma-informed approaches into their intervention models. Taken together, this body of evidence suggests that mentoring can positively influence youth behavior when it provides stable relationships with supportive adults, supervised environments, and practical tools to strengthen self-regulation, decision-making, and conflict-resolution skills. These mechanisms appear to help young people develop healthier behavioral patterns, reduce involvement in risky or violent activities, and improve their social and academic outcomes.

One of the first rigorous evaluations of mentoring programs in the United States is Grossman and Tierney (1998). The study evaluates the Big Brothers Big Sisters program using random assignment to treatment and a waitlist control group. Although participants were of school age, the program was not implemented by schools or during school hours, so it is best classified as a community-based intervention that complements the school system rather than a school-based program.[29] After 18

[28] Dinarte-Díaz *et al.* (2024), through a randomized trial in 21 schools in El Salvador, Honduras, and Guatemala, show that complementing extracurricular clubs with socio-emotional learning improves school behavior and can reduce dropout, particularly among more vulnerable students. Although this study is closely related to previous evidence, it was not included in the review because it does not estimate effects on crime indicators.

[29] Participants were primarily youth from single-parent households. The program matched each participant with a carefully selected, trained, and supervised adult volunteer mentor. Mentors and youth committed to meeting two to four times per month for at least one year. In practice, participants accumulated approximately 144 hours of direct contact with their mentors.

months, youth assigned to the program were 45.8% less likely to initiate illegal drug use, 27.4% less likely to begin consuming alcohol, and reported 32% fewer incidents of physical aggression. However, based on participants' self-reported data, the study found no effects on theft or property damage. The program also reduced school absenteeism and improved participants' perceptions of their academic competence. The proposed mechanisms underlying these effects include developing relationships with prosocial adults, emotional support, positive role modeling, stronger school engagement, and improved family relationships. The study does not include a cost–benefit analysis.

Rollin *et al*. (2003) evaluate a school–community violence prevention model targeting at-risk eighth-grade students in three public schools in Florida. Unlike Grossman and Tierney (1998), the intervention was implemented within schools and during school hours, making it more directly comparable to other school-based programs. The program consisted of structured weekly group sessions involving counseling, emotional regulation, and conflict resolution, complemented by family involvement sessions.[30]

Although the study compares a treatment group and a control group, each comprising 78 students, it is not a randomized experiment. Students were referred by teachers, counselors, or parents based on behavioral risk profiles, and the comparison group was selected from students with similar risk profiles in the same schools. This limits the internal validity of the estimates, as the groups may differ in unobserved characteristics. In addition to absenteeism and school suspension outcomes, the authors measure offenses committed on school property, including intentional fire-setting, physical assault, breaking and entering, property damage, and theft.

The results show significant reductions in these school-based offenses, particularly physical assaults and property damage, relative to the control group. Offenses committed on school property declined by 2.34 incidents per student in the North Florida school, 7.68 incidents per student in the Central Florida school, and 3.14 incidents per student in the South Florida school. These reductions correspond to 115%, 125%, and 193%, respectively, of the post-intervention control group mean, indicating substantial decreases in disciplinary and delinquent behavior. However, given the limitations of the identification strategy, these results should be interpreted with caution.

The proposed mechanisms include the presence of a prosocial adult mentor, the development of social and employment-related skills, stronger connections between schools and communities, vocational guidance, structured supervision of students' time, and behavioral incentives. The study does not report per-student costs or provide a cost–benefit analysis.

Abdul-Razzak and Hallberg (2024) evaluate the Choose to Change (C2C) program in Chicago, a six-month intervention combining intensive mentoring, comprehensive social services, and trauma-informed group therapy based on CBT principles. The intervention was designed on the premise that chronic exposure to violence and adversity can shape behavioral responses, emotional regulation, and decision-making processes. By combining supportive adult relationships with therapeutic skill development and access to services, C2C aimed to reduce violent behavior and improve broader

[30] The model consisted of multiple components, including a mandatory three-week orientation period during which students were taught prosocial skills, behavioral norms, and program expectations. In addition, participants were required to complete a supervised work-placement internship that included one-on-one adult mentoring in the workplace. Each school had a designated coordinator responsible for ongoing monitoring, and students were subject to biweekly evaluations and behavioral contracts. The program also provided training in employability skills, social skills, problem-solving, behavior management, and career exploration. Participation was relatively intensive. On average, students remained in the program for 166 days, dedicating approximately two hours per day, four days per week.

developmental outcomes among highly vulnerable adolescents. The program targeted youth aged 13–18 living in neighborhoods characterized by high levels of violence and an elevated risk of contact with the criminal justice system. Using random assignment through a lottery, the authors measure effects at 12 and 24 months using administrative crime records.[31]

The program led to a 3.7-percentage-point reduction in the probability of arrest for a violent offense, equivalent to 23% of the control group mean. These effects persisted for up to three years after random assignment, although their magnitude diminished over time. The study found no consistent effects on arrests for property crimes, drug-related offenses, or other categories of crime. The results indicate that the reductions were concentrated in arrests involving low levels of police discretion,[32] suggesting that the program changed behaviors associated with violence and interpersonal conflict rather than merely reducing participants' exposure to discretionary police contact. The proposed mechanisms include improvements in emotional regulation, decision-making, trauma management, relationships with supportive adults, and the practical application of socio-emotional skills acquired through mentoring and group therapy. Program costs were estimated at US$5,000–US$7,600 per participant, although the study does not provide a comprehensive cost–benefit analysis.

However, not all mentoring programs necessarily have positive effects on crime reduction. Rodríguez-Planas (2012) evaluates the Quantum Opportunity Program (QOP), a five-year intervention that combined intensive mentoring, academic services, life-skills activities, community service, and financial incentives for low-performing high school students in the United States. The study uses random assignment and follow-up surveys conducted when participants were approximately 19, 21, and 24 years old. Five years after the program ended, QOP increased the probability of having been arrested or charged during the preceding two years by 4.4 percentage points. These adverse effects were concentrated among males. This heterogeneity mirrors the program's broader results, as females experienced improvements in education and employment, whereas males did not. The author suggests that mentors may have inadvertently weakened the deterrent effect of sanctions by advocating for participants both in school and when they encountered the criminal justice system, although the experimental design cannot establish this mechanism. Given that QOP cost nearly US$25,000 per participant and that the study does not include a formal cost–benefit analysis, its limited overall labor-market effects and adverse effects on crime among males raise serious questions about its cost-effectiveness.

Sports Programs

Finally, two studies of sports programs with behavioral components provide estimates of their effects on crime or other outcomes involving contact with the criminal justice system.

[31] Although C2C is not a traditional school-based program, its connection to the educational system is substantial, as most participants were referred through public schools, alternative schools, school reengagement centers, or school safety offices. The mentoring component paired youth with trained mentors who provided individualized guidance, support, and case management. Participants also attended weekly trauma-informed group sessions designed to strengthen emotional regulation, coping skills, decision-making, and conflict resolution. In addition, the program connected youth and their families to a range of social services addressing needs related to education, employment, mental health, housing, and family stability. Between 2015 and 2019, the authors conducted a large-scale randomized controlled trial involving 2,074 participants, with 1,052 youth randomly assigned to the treatment group and 1,022 to the control group.

[32] An important contribution of the study is its use of police narratives and machine-learning techniques to distinguish between arrests involving high levels of police discretion and those involving low levels of discretion.

Hartmann and Depro (2006) examine the relationship between Midnight Basketball programs and urban crime rates in the United States during the 1990s.[33] The results indicate that cities operating these programs experienced greater reductions in crime, particularly property offenses. Program adoption was associated with an additional reduction of approximately 5% in property crime rates. However, these findings should not be interpreted as definitive causal evidence, as program adoption may have been correlated with other crime prevention strategies or unobserved characteristics of participating cities. The authors also note that the programs were relatively small in scale and therefore unlikely to explain reductions of this magnitude on their own. Nevertheless, the study suggests that community sports programs may operate through indirect mechanisms, such as increasing the visibility of prevention efforts, strengthening community trust, and complementing broader public safety and crime prevention initiatives, rather than exclusively through direct effects on participants.

Spruit *et al.* (2018) present one of the few quasi-experimental evaluations of sports interventions for juvenile delinquency prevention that use official police and judicial records to measure criminal outcomes. The authors evaluate the Only You Decide Who You Are (AJB) program in the Netherlands.[34] Using a quasi-experimental design involving 368 youth aged 12–18, the authors compare AJB participants with a comparison group of students from the same or similar schools that did not offer the program.

The results show a significant reduction in the probability of being registered as a criminal suspect during the 16 months following the start of the intervention, with effects concentrated in property crime and drug-related offenses. Specifically, 11.0% of youth in the treatment group were recorded as suspects, compared with 15.1% in the comparison group. However, the study finds no significant effects on the number of police records among those who committed offenses, suggesting that the program reduced the extensive margin of delinquent involvement but not necessarily the intensity of offending among youth who became involved in crime.

The authors do not clearly identify the mechanisms underlying the observed effects. In fact, they find no significant effects on risk and protective factors measured through teacher and student reports, including behavioral problems, aggression, peer pressure, prosocial behavior, and academic engagement. They further argue that the effectiveness of sports-based interventions is likely to depend on the quality of the sporting environment, the pedagogical role of coaches, and the presence of program components beyond sports activities.[35]

2.7. School Sanctions for Poor Performance or Misconduct

Student discipline is a central component of educational policy and, in practice, encompasses a continuum ranging from corrective support to punitive sanctions, such as grade retention, suspension, or expulsion. Although these measures seek to manage classroom behavior and

[33] These programs consisted of late-night basketball leagues targeting young men aged 17–21 living in high-risk urban environments and were implemented during hours considered particularly conducive to criminal activity. Using annual data from the FBI Uniform Crime Reports for cities with populations exceeding 100,000 between 1985 and 2001, the authors compare 28 cities that were early adopters of officially sanctioned leagues with 171 cities that did not adopt the program.

[34] This sports intervention, designed for adolescents at risk of juvenile delinquency, connects schools with local sports clubs and offers training sessions twice a week for approximately one year. Developed by the Ministry of Security and Justice, the program aims to strengthen prosocial relationships, improve behavioral skills, and reduce risk factors associated with offending. Participation costs, sports equipment, and club membership fees are fully financed by the Ministry. Coaches are selected for their ability to serve as positive role models and work effectively with at-risk youth, although they do not receive specific formal training to implement the intervention.

[35] The authors cite evidence showing that some teams exhibited stronger coaching practices and a more favorable socio-moral climate than others, suggesting that variation in implementation quality may help explain the average effects observed. Additionally, they note that nearly half of the youth in the comparison group participated in sports activities outside AJB, which may have attenuated the estimated program effects.

maintain school order, their consequences for students' educational trajectories and long-term outcomes have become the subject of growing academic and policy debate.[36] By disrupting educational trajectories, increasing school disengagement, or exposing students to more punitive disciplinary environments, these measures may increase the risk of dropout and subsequent contact with the criminal justice system.

Beyond academic outcomes, the economics literature has begun to quantify the long-term consequences of these measures for behavior and crime, showing that certain school sanctions can significantly affect the probability of criminal involvement during adolescence and adulthood. Table 1 illustrates this pattern: among the three studies reviewed in this paper, 67% find increases in incarceration, 33% find increases in non-violent crime, and 33% find increases in violent crime, while none reports reductions attributable to the sanctions themselves. The only reduction observed in this category is associated with a summer remedial component—a support intervention designed to prevent grade retention rather than a punitive measure.

The three studies included use RD or value-added methods to evaluate the effects of two common disciplinary measures: grade retention—which, in some cases, is accompanied by remedial programs—and suspension.

Eren *et al*. (2017) estimate the short- and medium-term effects of the test-based promotion policy implemented in Louisiana beginning in 1998 for fourth- and eighth-grade students on juvenile crime.[37] Their identification strategy exploits a fuzzy RD design based on the test score cutoff separating promoted from retained students. The policy creates two discontinuities: the March cutoff, which combines eligibility for summer school with the threat of grade retention, and the July cutoff, which primarily captures the effects of the threat or actual implementation of grade retention. This allows the authors to estimate the implicit effect of summer remedial courses.

The results differ depending on grade level and the credibility of the threat of grade retention. In fourth grade, retention has adverse effects on educational persistence, the potential benefits of summer remedial activities are at best modest and temporary, and no effects are found on juvenile delinquency or convictions. Specifically, marginally failing to meet the March cutoff has no statistically significant effect on the probability of dropping out, but marginally failing in July, when the probability of grade retention increases substantially, raises the dropout rate by 3.1 percentage points. The authors also find that positive effects on academic performance fade over time.

For eighth grade, the two cutoffs affect dropout rates in opposite directions, and only the March cutoff affects juvenile convictions. Marginally failing to meet the March cutoff reduces the probability of dropping out by approximately 1.3 percentage points, equivalent to about 10% of the dropout probability among students who pass. However, marginally failing to meet the July cutoff increases the dropout rate by 3.4 percentage points, an effect of approximately 10%. Taken together, these

[36] For example, the available empirical evidence from the United States is mixed. Pope and Zuo (2023) document that a substantial reduction in suspensions in Los Angeles (from 8% to less than 1% between 2003 and 2015) is associated with lower standardized test scores, lower GPAs, and higher teacher turnover. By contrast, Craig and Martin (2026) find that reductions in suspensions in New York City improved learning in secondary education.

[37] Under this system, promotion depends on achieving a minimum score on standardized mathematics and language tests administered to all students in March. Students who do not meet the threshold are assigned to free, intensive summer remedial programs and may retake the tests in July. If they again fail to achieve the required score, they face a high risk of grade retention, although exemptions are available in some cases. The analysis is based on administrative data on educational trajectories and juvenile justice convictions, using cohorts of fourth-grade students from the 1998–99 through 2002–03 school years and eighth-grade students from the 1998–99 through 2004–05 school years.

results suggest that the remedial component may improve school persistence in eighth grade, while grade retention remains harmful.

Regarding juvenile delinquency, only remedial support has an effect among eighth-grade students who score just below the passing threshold; failing the July cutoff, which determines grade retention, does not affect juvenile convictions. Marginally failing to meet the March cutoff reduces the probability of receiving a juvenile conviction by approximately 0.34 percentage points, with evidence of larger reductions for serious offenses. The authors argue that this result cannot be explained solely by short-term incapacitation during the summer, as the effects persist over longer periods. This suggests that improvements in academic performance and educational trajectories are the most plausible mechanisms. Given that grade retention entails substantial fiscal costs, estimated at US$12,600 per student per year, and is associated with higher dropout rates, the authors conclude that grade retention policies are difficult to justify. However, strengthening remedial interventions, such as well-designed summer programs for eighth-grade students, could reduce both school dropout and juvenile delinquency.

Eren *et al*. (2022) complement the previous study by analyzing the causal effect of an increased probability of repeating eighth grade on criminal involvement in adulthood (by age 25) in Louisiana. They show that repeating eighth grade increases violent crime in early adulthood and worsens several school-related indicators. Their identification strategy uses a fuzzy RD design and links educational records to administrative data from the state's adult criminal justice system.[38] The analysis focuses on males, as the proportion of females with adult criminal records is very small in the study population. The results show that grade retention increases the probability of conviction for a violent crime by 1.05 percentage points, equivalent to a 58% increase relative to the mean, and also increases offending on the intensive margin, as measured by the number of violent crime convictions.[39] The magnitude of this effect, estimated at the cutoff, implies that forced grade repetition has a persistent and significant effect on adult criminal trajectories.

The paper explores several mechanisms, including the deterioration of educational trajectories and non-cognitive skills. Three years after grade retention, absenteeism increases, with effects that grow over time, and behavioral problems at school become more frequent. The authors also find that grade retention increases the probability of dropping out by 16%, although they argue that this channel explains only a fraction of the increase in violent crime. In addition, retention leads students to transition to middle and high schools with lower-achieving peers and a smaller proportion of White students. Consistent with previous evidence, the authors find no robust effects on juvenile crime, suggesting that the effects materialize primarily during early adulthood.

Finally, the study presents estimates of the social costs associated with the increase in violent crime, calculating losses of US$2.6 million–US$18.4 million for the cohorts analyzed. These findings imply that the academic benefits of a grade-retention policy would need to be substantial to offset its social costs.

Bacher-Hicks *et al*. (2024) document that attending schools with a higher propensity to suspend students (a more punitive disciplinary approach) increases subsequent arrests and incarceration,

[38] The analysis focuses on cohorts of eighth-grade students from the 1998–99 through 2000–01 school years, tracking criminal outcomes over 1996–2012.

[39] The first stage shows that failing to achieve the minimum score on the July examination increases the probability of repeating eighth grade by approximately 68 percentage points. Although the coefficients for the probability of committing any crime, property crimes, or drug-related offenses are positive, they are not statistically significant. However, when the analysis is extended to inframarginal students, the authors find positive and significant effects on both property and drug-related offenses, suggesting that local estimates around the cutoff may underestimate the overall impact of the policy on low-performing students.

with particularly large effects among Black males. They investigate the causal effect of attending a school with a more punitive disciplinary environment on long-term criminal involvement. Drawing on the teacher value-added literature, the authors estimate school effects on suspensions for middle schools in the CMS district, controlling for standardized mathematics and reading test scores and other individual characteristics.[40]

Regarding academic outcomes, the authors find no short-term improvements in standardized mathematics or reading test scores. By contrast, they observe deterioration in human capital accumulation over the medium and long term, reflected in a higher probability of dropping out and a lower probability of attending a four-year college. Moreover, the effects on criminal behavior in early adulthood are also adverse. Between ages 16 and 21, exposure to more punitive schools increases the probability of arrest by 3.2 percentage points, equivalent to approximately 17%, and the probability of incarceration by 2.5 percentage points, or approximately 20%. It also increases the total number of arrests and incarceration episodes.

These effects are concentrated among males and are particularly large among Black males, thereby widening racial disparities in educational attainment and contact with the criminal justice system. When disaggregated by offense type, the increases are concentrated in property crimes and drug-related offenses, with no evidence of effects on serious violent crime. The authors also document that the increase in criminal justice system involvement is most pronounced between ages 19 and 21, consistent with persistent effects on criminal trajectories. The authors rule out the possibility that these results are driven by changes in peer composition or differences in academic quality. Instead, they show that a substantial proportion of the variation in disciplinary practices is associated with school leadership: a change in principal reduces the year-to-year persistence in schools' propensity to suspend students by nearly 30%, and schools with a more positive school climate tend to rely less on suspensions.

2.8. Economic Incentives Related to Educational Outcomes

Following Becker's (1968) economic approach to crime, the decision to engage in criminal activities is closely linked to economic incentives. It is therefore not surprising that studies have found that educational policies affecting returns to education, income, and the opportunity cost of crime—through wages, school subsidies, vouchers, or employment programs—significantly affect involvement in criminal activities.[41] CCTs occupy a central place within this group, particularly in Latin America, where they have become one of the main instruments of social policy.

Although evidence exists on the indirect effects of large-scale transfer payments on aggregate crime, causal evidence on the direct effects of these programs on criminal involvement among young beneficiaries remains limited.[42] In Latin America, initial causal evidence focuses on the indirect effects of large-scale disbursements on aggregate crime on payment days, with mixed results in

[40] To address student sorting across schools, the authors exploit the unanticipated redrawing of school attendance boundaries in 2002–03, which reassigned nearly half of the students to new schools for administrative reasons. They find substantial heterogeneity across schools in their propensity to suspend students, and this variation cannot be explained solely by observed differences in student composition. This quasi-exogenous variation allows them to identify the effect of exposure to schools with different disciplinary standards. In the first stage, they show that a one-standard-deviation increase in this measure raises the number of suspension days per year by 0.38, or approximately 16%, primarily through out-of-school suspensions.

[41] Most studies focus on high-income countries and analyze programs such as migrant assistance schemes and support programs for individuals with disabilities and their family members.

[42] Some studies from the region measure effects on domestic violence (Hidrobo and Fernald 2013; Ritter Burga 2014; Hidrobo *et al.* 2016; Camacho and Rodríguez 2020) or even suicide (Machado *et al.* 2024).

cities in Uruguay and Colombia. By contrast, reductions in crime around schools have been documented in Brazil.[43]

This review identifies only two studies that directly examine this relationship and meet the methodological criteria for causal estimation through DiD and RD designs. Table 1 indicates that both studies—Chioda *et al*. (2016) for Brazil and Attanasio *et al*. (2021) for Colombia—report reductions in crime (in non-violent and violent crime in the former and in overall arrests in the latter), but neither examines effects on incarceration or school crime. Although the results are positive, the small number of studies and differences in their scope preclude definitive conclusions for the region.

Chioda *et al*. (2016) estimate the effect of the Bolsa Família program on crime in São Paulo. The authors combine georeferenced administrative program data with school enrollment records, police incident reports for areas surrounding schools, and socio-economic information at the neighborhood level. Their identification strategy exploits the program's expansion in 2008, which extended eligibility to adolescents aged 16–17.[44]

The results show that the expansion reduced crime around schools by approximately 6.5%, equivalent to about 2.1 fewer offenses per additional student covered per year. When disaggregated by offense type, the reduction is concentrated in property and violent crimes. For drug-related offenses, the estimated reduction is relatively large but less precisely estimated. By contrast, the effects on theft and vandalism are not robust. To explore mechanisms, the authors compare offenses committed on school and non-school days and at different times of day. They conclude that incapacitation does not appear to be the primary channel, as reductions are similar on school and non-school days. Overall, the evidence is more consistent with an income-related mechanism, whereby transfers reduce incentives to engage in economically motivated crime, although other mechanisms, such as changes in daily routines or peer networks, cannot be entirely ruled out.

Attanasio *et al*. (2021) evaluate the long-term effects of Familias en Acción in Medellín, Colombia, by combining administrative program records with data from Sisbén II, educational databases, and arrest records. Identification relies on an RD design that exploits the program's eligibility threshold, set at a Sisbén score of 11 points or below.[45] Regarding crime, the authors find a significant reduction in arrests among males. The intent-to-treat (ITT) estimate indicates a 2.7-percentage-point reduction in the probability of arrest relative to a baseline rate of 6.2%, equivalent to a 44% reduction. The local average treatment effect (LATE) estimate reaches 6.4 percentage points. Regarding mechanisms, the study does not provide a detailed causal analysis of the underlying channels, but it reports a descriptive mediation analysis suggesting that increased educational attainment may account for approximately one-quarter of the effect on arrests, consistent with a human capital accumulation

[43] Camacho and Mejía (2013) find that arrest rates in Bogotá decrease on days when the national government disburses transfers, particularly for property offenses. By contrast, Borraz and Munyo (2020) document that payment days—when transfers were made in cash—increase property offenses in Montevideo.

[44] Specifically, the paper estimates the contemporaneous effect of an increase in the number of adolescent beneficiaries within a school on offenses committed in the surrounding catchment area, defined by the school closest to each recorded offense. To address the correlation between program coverage, poverty, and other local characteristics associated with crime, the authors instrument changes in the number of beneficiaries using the interaction between (i) the initial size of the cohort aged 16–17 in each school before the expansion and (ii) a post-expansion indicator. They also include school and year fixed effects, cluster standard errors at the school level, and control for school and demographic characteristics.

[45] In the first stage, the authors show that crossing the cutoff generates a discontinuous increase in the probability of receiving program benefits, allowing them to estimate both ITT and LATE effects. The analysis focuses on the cohort of children aged 7–17 in 2007, when the program's urban expansion began, and measures outcomes during 2015–17, when these individuals were transitioning into adulthood. Regarding education, the program reduces high school dropout rates by 5.8 percentage points for both males and females, relative to control group means of 61.6% and 50.4%, respectively. In addition, among males, tertiary enrollment increases by 1.7 percentage points relative to a control group mean of 11.9%. Among females, the program reduces teenage pregnancy by 2.3 percentage points.

mechanism and a higher opportunity cost of engaging in criminal activity. The authors do not conduct a long-term cost–benefit analysis of the program.

2.9. Learning on the Job: School-Vacation Employment Programs

The literature on youth employment programs, broadly defined, suggests that these interventions are costly and intensive and, on average, do not show consistent effects on juvenile crime. However, a specific type of intervention—paid summer employment programs for at-risk youth—has generated more promising and consistent evidence in recent years. Unlike other, longer and more costly youth employment programs, which generally target youth who have already dropped out of school or are outside the labor market,[46] these interventions target youth enrolled in school. They are short-duration programs that maintain educational engagement while providing structured activities during school vacations—a period of heightened risk of criminal involvement because of reduced adult supervision and the absence of structured activities. In many cities, places in these programs are also allocated by lottery, enabling evaluation through highly credible causal designs. The six studies included, all conducted in the United States, show that these interventions can reduce criminal involvement even when their effects on future employment and earnings are modest or temporary. As Table 1 shows, 67% of the studies find reductions in violent crime, 50% in non-violent crime, and 33% in incarceration.

The review identifies six studies, all conducted in the United States, that estimate the effects of these programs on youth involvement in criminal activities. These studies exploit a distinctive feature of summer employment programs—demand typically exceeds the number of available places—so lotteries are used to randomly assign participants, allowing for rigorous experimental or quasi-experimental identification.

Heller (2014) evaluates the One Summer Plus (OSP) program in Chicago, an eight-week intervention offering part-time paid summer employment at the minimum wage. Community organizations recruited at-risk youth aged 14–21 from high-crime neighborhoods. The program included two treatment arms: (i) a standard employment component consisting of 25 hours of work per week and mentoring by an adult (approximately 10 youth per mentor); and (ii) an alternative arm consisting of 15 hours of work per week and 10 hours of socio-emotional skills training based on CBT. The study uses random assignment through a lottery and links participant data to administrative police records to measure outcomes.[47]

The results show that, 16 months after assignment, the program significantly reduces arrests for violent crimes by 43%.[48] No significant effects are observed on arrests for non-violent crimes (i.e., property crimes and drug-related offenses), suggesting an effect specifically on violence. Moreover, the timing of the effects indicates that they emerge after the program has ended rather than during

[46] Two landmark federal programs in this area are Job Corps and the National Guard Youth ChalleNGe Program. Both are long-term residential interventions targeting youth who have dropped out of secondary school or are not progressing through it. As Davis and Heller (2020) note, some of the pessimism in this literature stems from imprecise assumptions about which outcomes are plausible and for which populations they should be expected. When analyses focus appropriately on high-risk youth and measure outcomes over suitable time horizons, effects tend to be larger and more consistent.

[47] The study is based on a randomized experiment involving 1,634 high school students from 13 schools in neighborhoods with high levels of violence. The average participant was 16.3 years old, most were African American, participants generally came from disadvantaged socio-economic backgrounds, and about 20% had a prior arrest. Local community organizations served as intermediaries, placing youth primarily in public-sector jobs and nonprofit organizations.

[48] In absolute terms, violent crime arrests fall from approximately 0.09 to 0.05 per participant, equivalent to a 43% reduction relative to the control group.

the summer itself, ruling out incapacitation as the sole mechanism. The study finds no effects on school attendance during the following academic year, suggesting that the mechanism does not operate through short-term human capital accumulation either. In addition, no meaningful differences are found between the two treatment arms, implying that socio-emotional and self-regulation skills may develop not only through the explicit CBT component but also through common features of the program, such as structure, adult supervision, expectations, and feedback in the workplace.

In the discussion, the author emphasizes that the effects may be underestimated because police records capture only a portion of violent incidents. Regarding the relationship between education and crime, the study suggests that preventive interventions targeting youth who remain connected to the school system can effectively reduce violence during a critical stage of the age–crime cycle. The author highlights that the effects during the summer may be partly explained by an incapacitation mechanism—participants have less unstructured time—but that their persistence beyond the summer suggests additional channels, particularly those related to socio-emotional development.[49]

Gelber *et al*. (2016) begin with the hypothesis that summer youth employment programs can generate benefits through three main channels: (i) income transfers to youth with a high marginal utility of consumption, reducing economic incentives to commit crime; (ii) human capital acquisition through work experience and skills developed during the program, which may encourage students to remain in school; and (iii) incapacitation, whereby paid employment occupies time that would otherwise be available for criminal activities. To evaluate these channels, they analyze the New York City Summer Youth Employment Program (SYEP) using random assignment through lotteries and link participant data to administrative records on mortality, arrests, and employment.[50] The study complements Heller (2014) by evaluating a substantially larger program—the largest youth employment initiative in the United States—over a much longer period.

The results show positive short-term effects on employment and labor income. In the year of participation, winning the lottery increases the probability of having worked during the summer by 71 percentage points and raises labor earnings by US$1,085. However, these effects on labor-market outcomes dissipate in subsequent years, suggesting that the program does not generate persistent improvements in human capital accumulation or formal labor-market attachment beyond the summer.[51]

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[49] The author emphasizes that interventions need not be delayed until young people drop out of school, as previous evidence documents that school dropout substantially increases the probability of criminal involvement. The reduction in violent offenses, but not economically motivated crimes, is consistent with mechanisms related to self-control, emotional regulation, responses to provocation, and stronger social ties in structured environments. Although a temporary increase in income could theoretically increase consumption of goods associated with criminal behavior (e.g., alcohol or drugs), the study finds no evidence of increases in drug-related arrests or other offenses.

[50] The paper analyzes participants who applied between 2005 and 2008. The program, targeting individuals aged 14–21, allocates places through lotteries because demand exceeds the number of available positions. By linking applicant information to administrative records, the authors follow participants for up to ten years after program participation. During the period analyzed, the average cost per participant was US$1,403 for a program providing up to seven weeks of work, with 25-hour workweeks. Jobs were concentrated in community organizations, public institutions, and small businesses, including summer camps, daycare centers, hospitals, museums, private firms, and government offices. The program is administered by community-based organizations that also provide approximately 17.5 hours of complementary workshops, representing about 10% of total program time, focused on career exploration, financial education, and pathways to further formal education. Random assignment through lotteries forms the basis of the identification strategy. Administrative participant records were linked to mortality, arrest, and employment databases for a follow-up period of several years.

[51] However, other sources of income decline by US$209, resulting in a net income gain of approximately US$876 during the first year. In the medium term, no positive effects on future earnings are observed. Instead, earnings decline by approximately US$100 per year over the following three years, so that by the fourth year, the cumulative net effect of program participation is approximately US$555. The authors also find no effects on postsecondary enrollment, suggesting no detectable effects on educational human capital accumulation.

By contrast, the effects on crime and severe violence are substantial. Program participation reduces the probability of incarceration in state prisons by 0.098 percentage points. Relative to a baseline incarceration rate of 0.99%, this represents a reduction of approximately 9.9%. The effects are larger among youth aged 19 and older (−0.48 percentage points), males (−0.22 percentage points), and youth without prior work experience. In addition, the program reduces the probability of death by 0.073 percentage points, equivalent to a reduction of nearly 17% relative to the baseline mortality rate. This reduction is larger among males (−0.14 percentage points), Latinos (−0.14 percentage points), and younger participants. Because the effect on mortality emerges primarily from the ninth year of follow-up onward, the findings suggest that the mechanism does not operate solely through incapacitation during the summer.

Although the authors lack information on offense types, the reductions in incarceration and mortality suggest decreases in criminal activity and violent incidents, consistent with the findings of Heller (2014).

Finally, the authors present a cost–benefit analysis focusing on mortality effects. Using standard assumptions about the value of a statistical life, they estimate that the program prevented approximately 83 deaths, generating monetary benefits of roughly US$747 million, far exceeding its total cost. The authors emphasize that an evaluation based exclusively on labor-market outcomes would incorrectly characterize the intervention as ineffective, as might be the case with other youth employment programs. Accounting for the monetary value of effects on crime and mortality fundamentally changes the cost–benefit calculation.

Modestino (2019) takes as a starting point the increase in gang-related youth violence and greater exposure to violent environments among youth in Boston. The study evaluates the effects of Boston's SYEP using a lottery-based design and combines administrative criminal justice records with surveys of treatment and control group participants to examine the mechanisms underlying criminal involvement.[52]

Regarding crime, the program does not reduce the probability of facing at least one formal charge but does reduce the intensity of criminal involvement, measured by the number of formal charges. The effects are concentrated in violent and property crimes. The reduction in property crime, approximately 29%, emerges relatively quickly, consistent with an income-related mechanism. By contrast, the reduction in violent crime, approximately 35%, emerges after a delay of roughly six months. The persistence of both effects beyond one year suggests that the program does not operate solely through incapacitation but also through more lasting changes in behavior and socio-emotional skills. The effects are concentrated primarily among males and are larger among youth with a higher *ex ante* risk of criminal involvement, although the heterogeneity by sex is the most robust finding.

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[52] The underlying hypothesis is that racial disparities in juvenile crime partly reflect structural inequalities in employment opportunities, adult supervision, and access to prosocial networks. In this context, summer youth employment programs may reduce crime through several channels, including incapacitation, behavioral changes resulting from interactions with adults, potential improvements in skills and aspirations, and income transfers. Boston's program provides approximately 25 hours of work per week for six weeks, from early July through mid-August, supplemented by approximately 20 hours of workforce training. The curriculum includes an assessment of participants' strengths and interests; the development of soft skills, such as communication, collaboration, and conflict resolution; preparation for job searches; and information about educational opportunities. The program targets Boston residents aged 14–24. The analysis focuses on the 2015 cohort, with the program implemented across 18 neighborhoods through a local intermediary organization. Because demand substantially exceeds the number of available places, participation is allocated through a lottery, allowing causal identification of program effects. The sample includes more than 4,000 applicants, with high compliance rates: approximately 84% of those offered a position participate.

Evidence on mechanisms comes from surveys administered before and after the intervention. Although the program improves perceptions of community connectedness and self-reported non-cognitive skills, such as self-control and conflict resolution, it does not generate changes in indicators typically associated with short-term human capital accumulation, such as active job-search behavior or educational expectations. This finding is consistent with the mixed evidence from other studies of summer youth employment programs. In the mediation analysis, improvements in specific socio-emotional skills, including emotional regulation, willingness to seek help, and conflict-resolution abilities, are associated with subsequent reductions in both violent and property crime. When these mediators are included in the empirical specifications, the treatment indicator loses statistical significance, consistent with the interpretation that part of the program's effect operates through these behavioral changes.

The cost–benefit analysis suggests that the benefits of crime reduction exceed the program's administrative costs by a ratio of approximately 3:1, although not all costs are monetized in the study. The author recommends caution when extrapolating these results, as the effects appear to be concentrated among youth with prior involvement in the criminal justice system.[53]

Davis and Heller (2020) seek to determine why and for whom summer youth employment programs reduce crime, examining whether employment effects vary across specific subgroups of youth, given that these programs target youth who remain enrolled in school, unlike traditional youth employment programs targeting school dropouts.

To address these questions, the authors use data from two randomized experiments conducted in Chicago and apply machine-learning methods, such as causal forests, to estimate heterogeneous treatment effects. The first experiment, conducted in 2012, is the OSP program evaluated by Heller (2014). In the second experiment, conducted in 2013, the intervention lasted six weeks—two fewer than OSP—and expanded eligibility to include school dropouts and youth with prior criminal records, allowing the authors to assess whether effects varied according to participants' risk profiles. The employment component was complemented by activities based on the principles of CBT, aimed at strengthening self-control, emotional regulation, and responses to conflict, as well as promoting the development of personal goals. The authors use administrative data from Chicago Public Schools, police records, and formal employment records to track participants for up to three years after assignment.

The results show substantial and consistent reductions in violent crime in both experiments. In the first, the program reduces arrests for violent crimes by 42% during the first year following the summer. In the second, the reduction is 33% in the first year. Combining both samples, the authors find a reduction of approximately 26% even after the program has ended, suggesting that the effects cannot be explained solely by temporary incapacitation. By contrast, there is no reduction in the total number of arrests, and the authors even document an increase in arrests for property crimes, suggesting a shift in the composition of criminal activity rather than an overall decline in criminal involvement. These results are robust across different specifications and remain statistically significant after two to three years of follow-up, particularly in the experiment incorporating CBT.

[53] Among the study's limitations and unresolved questions, the author notes that it is not possible to precisely disentangle how much of the observed improvement in socio-emotional skills comes from work experience itself and how much derives from the training curriculum, or to determine the optimal combination and intensity of these components. The study also discusses descriptive evidence from another Boston organization working with gang-involved youth, which appears to generate even larger effects. However, this evidence does not come from a comparable experimental evaluation and should therefore be interpreted with caution.

The authors rule out human capital accumulation or increases in the opportunity cost of crime as the main mechanisms, as they find no average effects on formal employment or educational outcomes consistent with an income-related mechanism.[54] They therefore conclude that the main mechanism is associated with changes in non-cognitive skills and behavior. Indeed, employers report that the program helps improve self-control, conflict management, responsiveness to criticism, and adaptation to workplace norms, while also changing participants' daily exposure to certain environments, routines, and informal employment opportunities.

Heller (2022) shows that the effects of summer youth employment programs persist when interventions are implemented on a larger scale, with more recent cohorts and through multiple program designs. The study uses administrative police and court records to measure criminal outcomes over different follow-up periods. It evaluates two experiments conducted in Chicago and Philadelphia. The first experiment evaluates a new version of One Summer Chicago Plus (OSC+), involving a younger sample, more service providers, and variations in treatment design to explore mechanisms.[55] One group receives a standard summer employment program consisting of 25 hours of work per week, while a second group receives 20 hours of work supplemented by a leadership and civic development component. The second experiment is implemented within Philadelphia's WorkReady program, which offers three tracks: community projects focused on addressing local problems, skills-development employment with adult supervision, and professional development internships with less supervision.

Despite differences in scale, design, and context, the author finds substantial effects on criminal activity over different periods. In Philadelphia, the program reduces arrests by 36%. Specifically, one year after the program, the probability of juvenile incarceration decreases by 0.5 percentage points from a baseline of 1.4%. Among participants, the effect reaches 1.5 percentage points, implying a reduction of nearly 80% relative to the control complier mean of 1.9%. The program also reduces the total number of arrests, driven primarily by reductions in other categories of arrests and, to a lesser extent, drug-related arrests. Although the first-year effects on arrests for violent and property crimes are negative, they are not statistically significant. In the second year, property crime arrests fall by 0.6 per 100 lottery winners, compared with 0.9 per 100 nonwinners.

In the 2015 Chicago experiment, first-year effects are concentrated in drug-related and "other" arrests. Among treated youth, drug-related arrests decline by 4.6 percentage points from a baseline rate of 5.2%, while "other" arrests fall by 6.3 percentage points from a baseline of 8.2%. By the third year, statistically significant reductions emerge in property crime arrests, which decline by 0.6 percentage points from a baseline of 1.4%, and in "other" arrests, which decline by 1.3 percentage points from a baseline of 6.2%. In addition, total arrests decrease by approximately 2.2 percentage points, representing a reduction of roughly 20%. This pattern differs from some earlier evidence, in which effects were concentrated in arrests for violent crimes. The author emphasizes that the prevalence of violent crime arrests in the control groups of the 2015 Chicago and Philadelphia cohorts was considerably lower than in the 2012–13 Chicago studies, reducing the statistical power to detect effects on violence even if proportional reductions were similar.

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[54] Although the heterogeneity analysis reveals increases in formal employment for specific subgroups of participants, primarily Hispanic youth, females, and those more strongly connected to school, these effects do not explain the reduction in violent crime.

[55] The OSC+ experiment examines the 2015 cohort, with a sample three times larger than that of the original experiment and an expansion from 5 to 19 service providers. The WorkReady program was evaluated during 2017–18. This large-scale initiative served between 8,000 and 10,000 youth and involved nearly 60 providers. Because demand exceeded available places, a portion of the positions was allocated through a lottery, allowing causal identification in a less targeted, more heterogeneous setting with lower levels of centralized control, thereby providing evidence on scalability and replicability.

The article also provides evidence on heterogeneity by risk level and the robustness of the findings across implementation models.[56] The effects are substantially larger among high-risk youth. In Chicago, the effect for this group is 13–26 times larger than for low-risk youth, while in Philadelphia it is 24 times larger. Although proportional effects are similar, this translates into much larger absolute effects and social benefits when programs successfully target youth at greater risk of arrest or incarceration.

The article presents several policy implications. First, summer youth employment programs can be scaled up without losing effectiveness on average, and when they successfully reach higher-risk youth, the benefits per participant may be even greater. Second, the evidence challenges the notion that it is too late to alter criminal trajectories among this population, suggesting complementarity between equity and efficiency objectives. Third, targeting high-risk youth presents operational challenges, as their participation rates tend to be lower, potentially requiring greater recruitment efforts, support, and measures to reduce access barriers. Finally, the article highlights the need for additional evidence on whether these results generalize to smaller cities, nonurban settings, and contexts with different peer-group compositions within programs.

Kessler *et al*. (2022) reanalyze New York City's SYEP using the same cohorts studied by Gelber *et al*. (2016), focusing on the program's contemporaneous effects on criminal activity during the months when participants were employed and incorporating a detailed cost–benefit analysis. Using administrative data and exploiting random assignment through program lotteries, the authors find significant reductions in arrests and convictions during the summer. Among eligible youth aged 16 and older, participation reduces the probability of any arrest by 17% and the probability of arrest for a violent crime by 23%. The effects on convictions are even larger. The probability of any conviction for crimes committed during the summer falls by 31%, while the probability of conviction for a violent crime declines by 38%. In addition, the program reduces the total number of arrests by 14% and the total number of convictions by 27%.

To analyze heterogeneity by risk level, the authors divide the sample into youth with at least one prior arrest and those without prior arrests. The results show that the effects are concentrated among youth with a higher initial risk of criminal involvement. For this subgroup, program participation reduces the probability of arrest during the summer by approximately 23%, while the probability of conviction declines by 52%. Moreover, the number of convictions decreases by approximately 47%.[57]

In the cost–benefit analysis, the authors report an average cost of approximately US$1,403 per participant. Monetizing only the benefits associated with crimes prevented during the summer, they find that, among high-risk youth, the social savings from avoided arrests range from US$625 to US$1,250 per participant, representing a substantial share of the program's cost. However, the monetized benefits for lower-risk youth are minimal. Nevertheless, the authors caution that these findings do not imply that the program should target only high-risk youth, as important externalities

[56] The author finds no systematic differences in effects across program models or providers, suggesting that the effects do not depend on a specific delivery format. Moreover, because the effects persist over time, the mechanism cannot be limited to incapacitation during working hours; instead, it likely involves behavioral changes and shifts in routines and social networks.

[57] Among lower-risk youth, contemporaneous effects on arrests and convictions are small and, in several cases, statistically insignificant. The authors also examine medium-term effects after one, three, and five years, although they caution that interpretation requires care, particularly for participants aged 19–21, because of potential biases arising from differential incapacitation associated with incarceration among members of the control group (Gelber *et al.* 2016). For this reason, they present results separately by age group and show that the most consistent patterns are concentrated among participants aged 16–18 at the time of program participation. For this group, arrests fall by 10%, and convictions by 20%.

may not be captured by the monetization exercise, including peer effects and the prevention of first-time involvement in the criminal justice system.

Regarding mechanisms, because the study does not directly measure socio-emotional skills, the evidence is more consistent with incapacitation and changes in daily routines, such as spending less time on the streets and experiencing less exposure to situations and encounters that could lead to police contact. The authors also acknowledge the possibility that prosocial signals, such as summer employment, may influence decisions within the criminal justice system. However, the study cannot conclusively identify this mechanism.

3 Discussion of Mechanisms and Cost–Benefit Analysis

The literature review on the causal effects of education on criminal behavior provides a useful framework for guiding public policy. This section summarizes the mechanisms through which these effects operate and, where available, the costs and benefits of these interventions. These aspects are presented in two tables covering each of the nine categories of educational policies and programs analyzed in the review. Table 11 systematizes the mechanisms that, according to the authors, explain the estimated effects. These are grouped into seven categories capturing the main channels identified in the literature. Table 12 summarizes the proportion of studies that conduct some form of economic analysis of the educational policy or program, distinguishing among those that estimate intervention costs, savings or benefits associated with crime reduction, and, where information is available, rates of return or benefit–cost ratios. It also presents the geographic distribution of the available evidence.

3.1 Mechanisms

In theory, education can reduce crime through three direct channels. The first is human capital accumulation. Consistent with Becker's (1968) seminal analysis, this mechanism suggests that additional years of schooling (quantity) and better learning (quality) increase skills, knowledge, employability, and expected wages, thereby raising the opportunity cost of committing offenses and reducing the probability of engaging in crime. This can occur through additional years of schooling, access to higher-quality education and improved learning, or both. The second channel is incapacitation. By keeping children and youth in structured, supervised school environments, education reduces the time available for risky activities, particularly during school hours or in extended-day settings, while increasing supervision and thereby contributing to crime reduction. Importantly, this channel is also closely related to peer concentration, discussed below. The third channel involves socio-emotional skills. Education affects not only academic outcomes but also socio-emotional and non-cognitive skills, particularly by improving self-regulation, emotional management, decision-making, and prosocial behavior while reducing impulsive responses, thereby lowering the probability of violent conduct.

Beyond these direct channels, education can generate additional effects that extend beyond the direct beneficiaries. These mechanisms identified in the literature can be classified into three groups. The first involves peers and social networks. Interactions with peers and social networks can shape aspirations, behavioral norms, and prosocial relationships, reducing criminal involvement among beneficiaries and, in some cases, within their immediate social circles. However, greater concentrations of youth in schools can also increase certain offenses or bring together youth with similar levels of risk of criminal involvement, attenuating the expected effects of some interventions. Conversely, in summer employment programs, schools, and even higher education institutions, peer interactions can foster prosocial relationships, new aspirations, and support networks that reduce

criminal involvement. The second is the marriage market channel. Education can influence long-term family decisions, including partner selection, household stability, and family income. The third is the intergenerational channel. Some studies show that benefits can be transmitted across generations, either because education improves parenting practices or because reduced criminal involvement among beneficiaries lowers the risk of criminal involvement among their children.

These mechanisms do not necessarily operate in isolation or always in the same direction. A single policy can simultaneously increase supervised school time, improve learning, strengthen non-cognitive skills, and alter youths' educational trajectories. However, its effects depend on the intervention's design and the context in which it is implemented. For example, a policy may reduce crime by increasing human capital accumulation or effective supervision but may also have unintended consequences if it increases dropout, weakens students' connection to school, concentrates high-risk youth, or generates peer interactions that reinforce problematic behaviors.

Table 11 summarizes these seven categories of mechanisms for each of the nine types of educational policies or programs. As the "Total studies" column shows, one of the most frequently mentioned mechanisms in the literature is human capital accumulation through educational quantity (additional years of schooling), identified in 35% of the studies reviewed. Human capital accumulation through educational quality is mentioned as an explanatory mechanism in 14% of studies, generally in connection with improved access to higher-quality education, which also tends to increase youths' interest and engagement in the educational system. In studies of higher education, this channel also appears to be linked to the higher wages youth can earn by attending higher-quality institutions. However, although human capital accumulation was the original channel through which the economics literature began examining the education–crime relationship, it is neither the only nor necessarily the predominant mechanism in isolation, as other mechanisms are mentioned with similar or greater frequency. These include incapacitation and socio-emotional skill development, identified in 33% and 38% of studies, respectively. In addition to explaining a substantial share of the observed effects, these mechanisms contribute to the positive rates of return generated by educational interventions, as demonstrated by the analysis of early childhood programs.

The peer channel is mentioned in 21% of studies and can operate in different directions depending on the type of program and outcome analyzed. Mechanisms associated with parenting and intergenerational effects appear in 14% of studies, either through improvements in parenting practices resulting from early childhood programs or because recent studies show that reducing beneficiaries' criminal involvement can also lower the risk of crime among their children. Finally, only 2% of studies identify the marriage market as a potential channel, highlighting how education can influence partner selection and, through this mechanism, subsequent criminal trajectories. Notably, few studies examine sufficiently long time horizons to assess this mechanism, which may help explain the relatively limited evidence available.

3.1.1 Mechanisms by Policy Type

Analyzing the evidence by program type is particularly useful, as it provides a more precise understanding of why authors emphasize certain mechanisms over others. This section discusses the findings summarized in Table 11.

More Years of Education. For policies that increase years of schooling, one of the most frequently mentioned mechanisms is human capital accumulation (53%), consistent with the hypothesis that

additional schooling increases the opportunity cost of crime by improving employability, expected wages, and the stability of employment trajectories. However, the most frequently cited mechanism in this category is incapacitation (65%), followed by peer effects (18%), particularly those related to the composition and concentration of students in school environments, which can increase school violence in certain contexts. Some studies identify family and intergenerational dynamics as potential mechanisms—for example, changes in the marriage market and reductions in parental criminal involvement (6%). Finally, socio-emotional skills are mentioned in only one recent study in this category.

More Time in School. In the literature reviewed, two mechanisms emerge most frequently to explain how additional time in school affects crime. Approximately 64% of the studies attribute crime reduction to incapacitation and increased supervision. By increasing the number of school days or hours of attendance, young people spend more time in structured, supervised environments, reducing their exposure to criminal activities outside school compared with periods when they are not attending. Meanwhile, 36% of studies suggest that increases in violent crime are driven by peer concentration and interaction. Additional time in school increases the concentration of youth in shared spaces, potentially intensifying friction, conflict, and episodes of violence, including school violence, particularly where school climate, effective supervision, and conflict management are inadequate. Only one study identifies human capital accumulation and the development of socio-emotional skills as the primary mechanisms through which additional time in school influences criminal behavior.

Better Quality. As expected, approximately 67% of studies analyzing access to higher-quality education and improved learning identify human capital quality as the main mechanism through which crime is reduced. However, none can precisely isolate which specific component of a school or university explains these results. In general, the studies refer to characteristics associated with higher-quality educational institutions, such as more qualified teachers, additional instructional time, greater supervision, and better academic outcomes, among others. Approximately 33% of studies highlight the importance of socio-emotional skills developed in schools and higher education institutions. Indeed, two studies construct school value-added indices for dimensions such as emotional well-being, perseverance, and diligence, recognizing the relevance of these non-cognitive characteristics for both families and students' future trajectories. Approximately 33% of studies highlight the importance of human capital quantity and peer effects on criminal trajectories, operating through both protective and risk-enhancing channels. On the one hand, exposure to more prosocial peers reduces the probability of criminal involvement. On the other, higher levels of racial segregation are associated with a greater probability of criminal involvement and poorer academic performance, even at the aggregate level. Finally, one study discusses incapacitation but notes that it operates dynamically rather than immediately, as higher educational quality and more favorable peer environments gradually influence students' persistence in school and educational trajectories.

Early Childhood Education. Regarding the mechanisms underlying crime reductions among beneficiaries of early childhood programs, the evidence suggests three important channels. First, because a substantial proportion of studies document increases in educational attainment among beneficiaries, human capital accumulation is mentioned in 50% of studies. A slightly higher proportion (56%) attributes crime reductions to the development of non-cognitive skills. By shaping socio-emotional skills and children's behavior—and, in some cases, caregivers' behavior—these programs improve decision-making and reduce risky behaviors. Indeed, as highlighted in the review, the seminal study by Heckman *et al.* (2013) shows that, among three sets of factors (cognitive skills, academic motivation, and externalizing behaviors), externalizing behaviors are the most important

determinant of reductions in crime and improvements in labor-market and health outcomes. The authors also emphasize that this dimension is particularly malleable and that, unlike effects on IQ, its effects tend not to fade over time. Additionally, 56% of studies identify the parental channel as a central mechanism, highlighting two dimensions: (i) improvements in parenting practices, as many programs include explicit caregiver support components; and (ii) intergenerational effects documented in more recent studies, whereby participants' children benefit indirectly from more stable parental trajectories, including lower criminal involvement, greater employment stability, and more structured households, with positive effects on second-generation outcomes.

Optimal Starting Age. Studies analyzing the effects of school-entry-age policies suggest four main mechanisms. First, when reductions in different types of crime are observed, approximately 50% of authors identify improvements in learning as the main mechanism. The underlying rationale is that children who enter school later have reached a more advanced stage of cognitive development and maturity, facilitating learning. Indeed, one study finds positive effects on standardized test scores among Black females, while another reports an increase in the probability of ranking in the upper part of the performance distribution among youth aged 13–15. However, by increasing the average age at which students complete secondary school, later school entry also extends the period during which students may drop out, reducing human capital accumulation and incapacitation—the two mechanisms that studies associate with potential increases in criminal involvement. In particular, the studies suggest that approximately 80% of the increase in criminal involvement is explained by higher dropout rates. Finally, a fourth mechanism involves peers. One study suggests that exposure to older classmates may positively influence classroom discipline and learning, increasing human capital accumulation and, consequently, reducing the probability of criminal involvement.

Beyond the Traditional Curriculum. Reductions in criminal involvement associated with extracurricular programs incorporating behavioral components operate primarily through the development of socio-emotional skills. Specifically, 80% of studies suggest that these interventions alter impulsive decision-making patterns by reducing automatic responses, such as immediate reactions to provocation, and fostering self-regulation and reflection. Although 20% of studies identify incapacitation—keeping youth occupied outside school hours—as a relevant mechanism, none considers it the primary channel. Finally, evidence from Latin America suggests that the composition of groups participating in extracurricular activities is also an important determinant of outcomes. In these contexts, concentrating youth at higher risk of involvement in violent incidents within the same groups can be counterproductive, potentially increasing violent behavior and reducing the short-term academic benefits identified in the studies.

School Sanctions. The mechanisms through which school sanctions for poor performance or misconduct affect criminal involvement operate primarily through changes in the quantity and quality of accumulated human capital. All studies reviewed find that these sanctions adversely affect youths' educational trajectories and human capital accumulation, thereby increasing the probability of criminal involvement. Grade retention, suspensions, and other punitive school progression rules can undermine educational trajectories, reduce student motivation, increase absenteeism, and raise the probability of dropout. This results in fewer completed years of schooling and limits the accumulation of knowledge and skills, potentially increasing the probability of criminal involvement. The only exception within this category is the study identifying positive effects associated with summer remedial programs designed to help underperforming students avoid grade retention. In this case, the mechanism operates not through the sanction itself but through a compensatory intervention that supports learning recovery, keeps students connected to the educational system, and prevents the adverse effects of grade retention on their educational trajectories. Additionally,

some authors propose mechanisms related to school climate. Schools with higher sanction rates tend to have less supportive learning environments, more conflictual student–teacher relationships, and lower levels of family involvement or cooperation—factors that may also help explain the observed crime outcomes.

Economic Incentives. The two studies evaluating the effects of economic incentives, such as CCTs, suggest that human capital accumulation is an important mechanism through which these programs reduce criminal involvement. Because the studies find that these programs reduce dropout, increase graduation rates, and, in some cases, increase the probability of entering higher education, the authors argue that CCTs increase human capital accumulation and thereby raise the opportunity cost of criminal activity. One study reports reductions in crime both during and outside school hours and on school and non-school days, suggesting that incapacitation—keeping youth occupied at school—is not the sole mechanism underlying the observed effects. Additionally, both studies suggest that transfers may affect family dynamics and the household environment by easing financial constraints and stress and reducing the need to generate income through illicit activities.

Learning on the Job. The most frequently identified mechanism is the development of socio-emotional skills, with 83% of studies emphasizing it as the main explanation for reductions in criminal involvement. An important finding in this literature is that no systematic differences in effects are observed between programs that explicitly incorporate socio-emotional skills components and those that do not. This suggests that these skills may develop through elements common to most interventions, such as relationships with mentors and supervisors, which are present in virtually all programs, and through the formation of social networks and behavioral norms associated with work experience and peer interactions. Consistent with this hypothesis, approximately 50% of studies highlight adult support and relationships formed during the program as potential mechanisms. Another mechanism, mentioned in 67% of studies, is incapacitation, as reflected in contemporaneous reductions in crime during program implementation. However, because a substantial proportion of the effects persist for up to a decade, the literature suggests that incapacitation alone cannot explain the medium- and long-term results. Accordingly, the prevailing interpretation attributes these effects primarily to changes in socio-emotional skills and behavioral trajectories.

3.2 Economic Analyses and Regional Evidence

This section summarizes the evidence on costs and benefits identified in the literature, along with the geographic origin of the studies. The results are presented in Table 12. As shown in the “Total studies” column, 65% of studies provide no estimates of either the costs or benefits associated with the educational policies or programs analyzed. Only 19% conduct some form of cost–benefit analysis, 14% report intervention costs only, and just 6% estimate benefits in terms of social savings from crime reduction. Regarding the geographic distribution of the evidence, 67% of studies examining the effects of education on crime come from the United States. Latin America and the Caribbean account for the second-largest share, although their representation remains limited, at only 19% of studies. The remaining studies come mainly from Europe and, to a lesser extent, other regions, including Australia. The remainder of this section discusses these patterns by type of policy or program analyzed.

Only one of the studies analyzing the effects of compulsory schooling laws conducts a formal cost–benefit analysis, possibly because these policies do not correspond to specific programs but rather to measures designed to keep marginal students in the education system. However, 18% estimate the savings associated with reductions in criminal involvement. Regarding geographic coverage, the

evidence on this type of policy comes predominantly from the United States and Europe, which account for 82% of studies, while Latin America and the Caribbean account for 12% and Australia for the remaining 6%.

Regarding additional time in school, none of the studies conduct a formal cost–benefit analysis or quantify the benefits generated. The only study providing quantitative cost data is Berthelon and Kruger (2011), which estimates an approximately 40% increase in operating costs associated with extending the school day in Chile. However, this study does not account for infrastructure costs, such as facility adaptations, construction, and equipment—essential considerations for scaling up these reforms. Regarding the geographic distribution of the evidence, five of the eleven studies come from the United States, while the remaining six are from Latin America and the Caribbean.

As shown in Table 12, none of the studies analyzing the effects of school quality on crime conduct cost–benefit analyses of access to higher-quality schools. Only two estimate social savings from crime reduction, while two others identify the need for additional resources. Regarding geographic origin, as in previous categories, most of the evidence (75%) comes from the United States. Only three studies come from Latin America and the Caribbean: one examines the effects of school quality in Trinidad and Tobago, while two analyze the effects of access to high-quality higher education institutions in Brazil and Colombia.

Early childhood programs account for the highest proportion of studies quantifying monetary returns. From the seminal studies associated with the Perry Preschool experiment to subsequent evaluations, the evidence consistently suggests that these interventions can be highly cost-effective, largely because of savings associated with reductions in crime and its social costs. In principle, similarly high returns could be expected in Latin America and the Caribbean if these programs successfully reduce criminal involvement, given the high prevalence of violence in several countries in the region. However, the evidence reviewed also reveals an important gap. To the best of our knowledge, no rigorous evidence is available for the region for this category of programs. With the exception of one study from Spain, the available analyses are based exclusively on evidence from the United States—a country whose institutional context and crime patterns differ substantially from those of countries in Latin America and the Caribbean. This limits the external validity of these findings for informing regional policy decisions and underscores the need for evaluations with long-term follow-up and comparable measures of the social costs of crime in the region.

The evidence on the costs and benefits of policies governing formal school-entry age is the most limited among the policy categories reviewed. None of the studies estimate either the social savings associated with crime reduction or the implementation costs of these policies. Moreover, as with the literature on early childhood programs, the evidence is concentrated in the United States and Europe, underscoring the need to complement these findings with regional evidence. Regarding school sanctions, only two of the three studies provide cost estimates. One quantifies the fiscal costs that grade retention and dropout impose on the education system, while another estimates the social costs associated with increased crime. Because the evidence does not suggest reductions in crime, it is unsurprising that none of the studies presents a comprehensive cost–benefit analysis. Notably, this is one of only two of the nine categories of policies or programs reviewed (together with school-vacation employment programs) for which the evidence comes exclusively from the United States, reinforcing the need to expand the empirical evidence base to other contexts, including Latin America and the Caribbean.

Among studies evaluating programs with behavioral components, only two include cost–benefit analyses. Both examine extracurricular programs incorporating CBT components implemented in

the United States and report benefit–cost ratios of approximately 30:1, suggesting that these interventions can be highly cost-effective when properly implemented. However, these programs are also relatively costly. In the United States, programs incorporating CBT components report costs of approximately US$1,000–US$1,850 per student. By contrast, in Central America, where implementation of these programs generally relies on nongovernmental organizations, reported costs range from US$269 to US$317 per student. Studies of mentoring and sports programs do not provide systematic information on costs or benefits, although some mentoring studies report per-participant costs. Regarding geographic distribution, as with other categories reviewed, the evidence on behavioral programs comes predominantly from the United States (70%), followed by Latin America and the Caribbean (20%) and Europe (10%).

The two studies analyzing the effects on crime of economic incentives tied to educational outcomes—specifically, CCTs—report estimates of the programs' fiscal costs to the government. However, neither quantifies the social savings associated with crime reduction; consequently, neither presents a cost–benefit analysis. Regarding geographic origin, both studies come from Latin America, but this does not imply that the available evidence is sufficient. On the one hand, only one study directly evaluates reductions in criminal involvement among beneficiaries. On the other, the second study does not measure individual criminal involvement but rather the incidence of crime in areas surrounding schools, limiting the interpretation of the program's effects on youth criminal involvement.

Finally, three studies conduct cost–benefit analyses of summer youth employment programs and generally conclude that these interventions are cost-effective. One quantifies the savings associated with reduced crime costs among high-risk youth—the group in which the estimated effects are concentrated—and suggests that these savings could be sufficient to cover program costs, although it does not conduct a comprehensive formal cost–benefit analysis. The other two studies report implementation cost estimates but do not incorporate potential social savings from reductions in arrests, despite documenting lower arrest rates. Regarding external validity, the available evidence comes exclusively from the United States, limiting the direct generalizability of these findings to other institutional and labor-market contexts.

4 Policy Recommendations for Latin America and the Caribbean Region

Educational policy can play an important role in crime prevention strategies. However, its effects depend on the type of intervention, the mechanisms it activates, and the populations it targets. This section translates the available evidence into concrete policy recommendations for each of the policy and program categories analyzed. We highlight the interventions that show the most consistent results, the contexts in which they appear most promising, and the key implementation challenges that should be considered to maximize their effectiveness.

Because less than 20% of the evidence reviewed comes from Latin America and the Caribbean, and much of the remaining evidence originates in countries with markedly different institutional, social, and economic conditions, we carefully assess the relevance of these findings for the region. The policy recommendations presented here are therefore not simply extrapolations from the existing evidence. Rather, they draw on the available research while taking into account the institutional realities, resource constraints, and policy priorities of countries across Latin America and the Caribbean.

More Years of Education. The analysis of the effects of compulsory schooling laws and other interventions that increase years of education on criminal involvement shows that these policies are

most effective at reducing non-violent crime and certain measures of incarceration and convictions. For violent crime, the effects are more variable and depend on the balance among incapacitation, human capital accumulation, and externalities generated by peer interactions and student concentration. This highlights the importance of accompanying these policies with measures that promote positive school climates and strengthen institutional capacity.

For Latin America and the Caribbean, strengthening laws that expand compulsory education is recommended because of their potential to improve the productivity and employability of future generations, which could, in turn, generate social benefits exceeding their costs. Many countries in the region already have laws requiring at least lower secondary education. However, in practice, many vulnerable youth drop out before completing secondary school. On average, 25% of youth aged 18–24 in Latin America and the Caribbean have not completed secondary education and are not attending an educational institution. This proportion is even higher in rural areas, where it reaches nearly 40%, compared with approximately 21% in urban areas (Arias Ortiz *et al*. 2026). For this reason, compulsory schooling laws will be effective only if complemented by programs that promote school retention and reduce dropout. Interventions such as CCTs, school meal programs, tutoring for students who need additional support, and school transportation to facilitate attendance have demonstrated effectiveness in reducing dropout. Following the example of Australia (Beatton *et al*. 2018), laws allowing greater flexibility for youth to participate in technical education programs may encourage continued education and, through employment and human capital accumulation, reduce involvement in criminal activities. Additionally, the evidence indicates that these policies should be accompanied by measures to improve school climate and mitigate the risks associated with the prolonged presence of youth in schools that cannot guarantee safe environments.

More Time in School. The policy implications of the literature on extending school time, whether through additional school days or longer school hours, can be organized into three dimensions.

First, increasing students' time in school should not automatically be assumed to reduce their risk of engaging in risky behaviors, violence, or crime. In some contexts, schools may not provide a safe environment, particularly when extended instructional time is not accompanied by measures to prevent and manage peer violence. The available evidence points to considerable heterogeneity in the effects of increased exposure to school environments. In the United States, for example, adverse effects on violence tend to be more pronounced among vulnerable youth and in low-income urban districts. These findings suggest that peer composition and institutional factors, including supervisory capacity, school climate, and conflict-management practices, play a critical role in shaping the outcomes of extended-school-time programs.

Second, program design and implementation quality matter. Unlike the evidence from the United States, the available studies from Latin America and the Caribbean do not find increases in violent crime associated with longer school days. One possible explanation is that interventions in the United States often involve changes in instructional time and attendance without complementary educational or social components, whereas reforms in Latin America and the Caribbean have generally combined extended school days with extracurricular activities, such as sports, arts, and music, alongside strengthened academic support. Third, these programs appear to be particularly effective as a prevention mechanism during critical stages of youth development. Three of the eleven studies find larger reductions in the probability of committing a first offense than in recidivism. This pattern suggests that extended-school-time policies may be particularly effective at preventing young people from entering criminal trajectories, thereby affecting the extensive margin of criminal involvement rather than the persistence of offending behavior.

For Latin America and the Caribbean, these findings suggest that extending instructional time should be accompanied by structured enrichment opportunities that foster student engagement and development. In addition, extended-school-time programs should incorporate measures that promote a safe and positive school climate, including conflict mediation mechanisms, adequate supervision, clear entry and exit protocols, and security measures around school premises. Such features may be particularly important in high-risk contexts, where students face greater exposure to violence both within and outside school. Although these interventions may require additional investments to ensure adequate implementation—including infrastructure, personnel, and school meal programs—these costs should be weighed against potential improvements in learning outcomes and reductions in property crime and other risky behaviors.

Better Quality. Studies on educational quality demonstrate that its effects extend well beyond academic achievement and can generate broader social benefits. The literature highlights the role of high-quality schools in fostering the development of socio-emotional skills, which are closely associated with positive long-term outcomes. Furthermore, several studies show that school composition matters. Vulnerable and higher-risk students tend to be disproportionately concentrated in less effective schools, even though they stand to benefit the most from attending more effective institutions. At the same time, school choice and reassignment policies should account for their system-wide effects, as selectively moving students out of low-quality schools may further concentrate disadvantaged students in the schools they leave behind. Drawing on this evidence, at least two policy recommendations emerge for primary and secondary education systems in Latin America and the Caribbean.

First, policies should aim to expand vulnerable students' access to high-quality schools while limiting their concentration in low-quality institutions. Achieving this objective requires reviewing school assignment systems across the region and identifying other barriers that may systematically restrict disadvantaged students' access to effective schools. Depending on the institutional context, relevant instruments may include assignment rules that incorporate equity-oriented criteria, as well as targeted scholarships or vouchers that increase access to better educational opportunities.

Second, the review suggests that high-quality schools contribute to multiple dimensions of child and adolescent development beyond academic learning. Measures of school effectiveness should therefore incorporate these broader dimensions when identifying high-quality schools and designing school improvement policies. More broadly, consistent with findings across several other interventions reviewed in this paper, education systems should invest in strengthening socio-emotional skills, student engagement, and other forms of educational support alongside academic learning, particularly during adolescence. These initiatives can help promote positive developmental trajectories, strengthen students' engagement with school, and reduce exposure to risk factors associated with delinquency and social exclusion. Most studies reviewed in this category do not conduct formal cost–benefit analyses, partly because many evaluate public or charter schools that do not necessarily require substantial additional fiscal expenditures but instead achieve better outcomes through more effective management practices and resource allocation. Nevertheless, even when additional investments are required, the potential gains in educational attainment, labor-market outcomes, socio-emotional development, and crime prevention suggest that such policies could be highly cost-effective from a social welfare perspective.

Two studies provide evidence on the effects of high-quality education at the tertiary level. Taken together, their findings suggest that expanding access to high-quality higher education can serve as an effective mechanism for reducing crime in both the short and medium term. However, the

evidence also indicates that the relevant factor is not simply increasing overall participation in tertiary education but rather facilitating access to high-quality institutions for vulnerable students. This distinction is important, as the benefits appear to be driven by the educational opportunities, peer environments, and labor-market prospects associated with more selective and effective institutions. Policymakers should prioritize strategies that enable students from disadvantaged backgrounds to enroll in high-quality higher education institutions. These may include scholarships, scholarship-loan programs, and reserved admission quotas for low-income, high-achieving students, with eligibility linked to enrollment in accredited institutions or those meeting verifiable quality standards. By reducing financial barriers and improving access to educational opportunities, such policies can strengthen incentives to invest in human capital and reduce involvement in criminal activities. Expanding access for vulnerable youth can contribute not only to public safety objectives but also to greater efficiency and equity within the education system by broadening opportunities for social mobility and reducing persistent socio-economic inequalities.

Early Childhood Education. The literature on early childhood programs offers numerous policy recommendations for Latin America and the Caribbean. Although several countries in the region have made important efforts to expand access to these essential services during early childhood, and evidence exists of short- and medium-term effects, little is known about whether these interventions have reduced crime over the long term in the region. International evidence, concentrated predominantly in the United States, suggests that these programs can have meaningful effects on risky behavior and criminal trajectories, particularly when they target vulnerable populations and are complemented by subsequent investments in educational quality. This highlights a critical knowledge gap in the region regarding the long-term effects of these policies on crime prevention. Four main policy implications emerge from the literature.

First, expanding coverage alone is unlikely to maximize crime prevention benefits. Evidence from the Perry Preschool Program (Heckman *et al*. 2010; Heckman *et al*. 2013) suggests that the long-term effects of early childhood interventions, including reductions in criminal behavior, operate less through academic gains than through improvements in socio-emotional skills, such as self-regulation and impulse control, and reductions in externalizing behaviors. Consequently, expanding access to these services is not sufficient to maximize their preventive effects. It is essential to strengthen service quality, explicitly incorporate content and practices aimed at socio-emotional development into program design, and coordinate investments with interventions supporting parents and caregivers.

Second, early childhood programs can be implemented effectively at scale while addressing persistent equity gaps. Evidence from large-scale programs shows that the long-term benefits of early childhood education, including improvements in educational attainment and employment and reductions in criminal involvement, can be achieved through large-scale public programs and are not limited to small, intensive interventions. At the same time, evidence on heterogeneous effects suggests that program targeting is essential, as the largest effects tend to be concentrated among children from the most disadvantaged backgrounds (Garces *et al*. 2002; Carneiro and Ginja 2014). Thus, targeting and universal coverage need not be viewed as mutually exclusive strategies.

Third, early childhood policies should not be considered independently of subsequent educational quality. The evidence points to complementarities between early interventions and investments in primary and secondary education. Early childhood programs generate larger and more persistent returns when followed by adequately resourced, high-quality schooling. For Latin America and the Caribbean, this underscores the need for integrated policy packages that combine high-quality early

childhood education with sustained improvements in K–12 schooling. A potentially cost-effective strategy is to target more intensive early interventions toward the most vulnerable children while simultaneously improving K–12 educational quality in the areas where these children attend school. Evidence of intergenerational effects further indicates that conventional evaluations may underestimate the full social returns to these investments. Anders *et al*. (2023) suggest that when educational coverage is already high, the marginal returns from expanding services may be lower, reinforcing the importance of prioritizing quality and targeting. Although such strategies require substantial resources, intergenerational evidence from García *et al*. (2023) and Barr and Gibbs (2022) indicates that these investments can be cost-effective, as some of their benefits are transmitted to the next generation, helping to break persistent cycles of poverty, exclusion, and violence.

Finally, expanded coverage should not be equated with effective policy. Evidence from universal childcare programs shows that large-scale expansion of low-quality services can adversely affect socio-emotional development and increase subsequent criminal involvement. Quality should therefore remain central to expansion strategies, with investments in teacher quality, cognitive and socio-emotional development, and parental engagement. Importantly, available long-term evaluations that explicitly account for program costs and a broad range of subsequent benefits indicate that well-designed early childhood interventions can generate positive net social returns. Thus, the relevant policy question is not simply whether to expand early childhood services but how to combine coverage, quality, and targeting to maximize their long-term social returns. Consequently, policymakers should prioritize investments with demonstrated effectiveness rather than assume that all increases in educational spending generate equivalent returns.

Optimal Starting Age. The evidence on policies and laws that delay school entry does not establish a robust, generalizable effect on crime prevention or reduction. In the United States, the findings suggest important trade-offs. Delaying school entry may reduce criminal behavior at younger ages but can also increase crime at later ages if it adversely affects educational trajectories, particularly through higher dropout rates. Effects vary substantially across populations and institutional settings, with some groups experiencing increases in incarceration and others experiencing beneficial effects. Taken together, these findings suggest that changing school-entry ages alone is an imprecise policy instrument for crime prevention and that its effects depend critically on the institutional context and the interaction between school-entry rules and subsequent schooling decisions.

For Latin America and the Caribbean, an important implication concerns the interaction between school-entry and school-leaving requirements. In countries where compulsory schooling is tied to age rather than educational attainment, implementing policies that make school leaving conditional on completing a minimum level of education, such as secondary school, may help reduce crime. Such policies could achieve the primary objectives of delayed-entry reforms—increasing educational attainment and time spent in school—while avoiding some of the unintended consequences associated with entering school at an older age.

In parallel, if delaying entry into primary school is considered, it would be essential to ensure that children attend high-quality preschool programs during the additional year before entering primary school, with an explicit focus on developing cognitive and socio-emotional skills. Otherwise, the potential costs of the policy could be substantial, particularly in contexts where preschool coverage is not yet universal and childcare alternatives vary considerably by socio-economic status. Overall, the evidence suggests that policies based on minimum grade-completion requirements and measures to strengthen the transition from preschool to primary school may be more promising than isolated changes in school-entry age.

Beyond the Traditional Curriculum. The evidence on socio-emotional, mentoring, and sports programs suggests that structured interventions delivered during or after school can contribute to crime prevention. First, evidence from the region shows that these effects can be achieved even in high-violence settings. Second, findings across different types of interventions suggest that effectiveness depends less on the specific activity than on key features of program design, including adult supervision, relationships with prosocial mentors, structured use of time, safe environments, and the explicit development of socio-emotional skills. Third, these programs require trained facilitators, clear protocols, and adequate monitoring, even when they do not rely on specialized clinical professionals. Fourth, targeting and group composition matter. Interventions often yield larger effects in high-violence settings and among youth at greater behavioral risk. However, grouping high-risk students together may increase stress, misbehavior, and negative peer effects. Conversely, recent evidence suggests that mixing participants with different levels of violence risk can benefit the most vulnerable without adversely affecting others. Programs should therefore target vulnerable populations while avoiding their segregation, favoring mixed-risk groups complemented by individualized support for students with specific needs.

For Latin America and the Caribbean, these findings suggest that such interventions offer a potentially valuable complement to traditional educational policies. However, the evidence must be interpreted with caution, particularly for mentoring and sports programs, for which most studies come from the United States and Europe and provide limited information on implementation costs. Furthermore, the available studies tend to assume certain enabling conditions for implementation that may not be present in all settings across Latin America and the Caribbean, without discussing them in detail. These include adequate school infrastructure, such as classrooms, sports facilities, lighting, and security; coordination with school schedules; safe transportation; recruitment and management of mentors or volunteers; and provision of meals or snacks for students. Therefore, when implementing or expanding these programs in the region, policymakers should carefully assess operational requirements and the costs of supervision, training, materials, and interinstitutional coordination, while establishing minimum quality standards. These programs should not be conceived merely as extracurricular activities designed to keep youth occupied but as structured prevention interventions requiring pedagogical design, continuous monitoring, and coordination with schools, families, school climate teams, and local authorities. Consequently, the transferability and cost-effectiveness of these interventions in the region remain uncertain and require further evidence.

An important finding is that combining extracurricular programs with psychology-based interventions, particularly CBT, or less intensive behavioral approaches, such as mindfulness, appears especially promising for large-scale implementation. Evidence suggests that these interventions can reduce criminal involvement while remaining relatively inexpensive and easier to implement than more intensive programs. Their effects also tend to be strongest among youth at the highest risk, underscoring their potential as cost-effective and scalable strategies for violence prevention and crime reduction.

School Sanctions. The literature on school sanctions, such as grade retention and suspension, consistently finds limited or adverse effects on learning, higher dropout rates, and an increased probability of subsequent criminal involvement. The evidence also identifies school climate as a potential mechanism, with higher sanction rates associated with less supportive learning environments, more conflictual student–teacher relationships, and lower levels of family involvement. These findings suggest that sanctions that disrupt educational trajectories may reinforce rather than address the underlying risks faced by vulnerable students.

For Latin America and the Caribbean, this evidence suggests that disciplinary policies should shift from exclusionary sanctions toward strategies that keep students engaged in school and address learning and behavioral challenges early.

First, automatic grade retention based on standardized test thresholds—so-called high-stakes policies—should be avoided. Instead, education systems should prioritize structured, intensive remedial interventions, such as targeted tutoring, literacy and mathematics support, and academic recovery programs delivered during the school year or school breaks. These interventions are particularly important at critical educational transitions, such as progression from primary to secondary school and from lower to upper secondary education, when the risks of academic disengagement and dropout are greatest.

Second, the use of out-of-school suspensions should be reduced and replaced with restorative and behavioral interventions supported by clear protocols, strong psychosocial services, and training for teachers and principals, prioritizing alternatives that address behavioral problems without disrupting educational progression. Third, early warning systems based on absenteeism, behavior, and poor academic performance should be strengthened to identify at-risk students and provide integrated academic and socio-emotional support before problems escalate and lead to sanctions. Fourth, school management and disciplinary practices should explicitly aim to strengthen school climate, student–teacher relationships, and family engagement rather than relying primarily on exclusionary sanctions. Taken together, these recommendations call for disciplinary practices to be designed as part of a broader system of student retention and support rather than exclusion, with particular attention to vulnerable students, especially those at the highest risk.

Economic Incentives. Evidence from the region shows that CCTs can reduce youth involvement in crime, with approximately 25% of this effect attributable to greater human capital accumulation. Accordingly, policymakers in the region should reinforce the core objective of CCTs: preventing school dropout, particularly at the secondary level, where dropout risks are highest. This can be achieved through payment schemes differentiated by age and academic performance, incentives linked to progression through key grades and educational completion milestones (Barrera-Osorio *et al*. 2019), and the integration of complementary interventions with demonstrated effectiveness in reducing dropout, such as tutoring, academic support, school meal programs, and transportation subsidies for at-risk adolescents. Finally, CCTs should be designed not only to promote school retention but also to facilitate successful transitions to high-quality higher education and formal employment, thereby strengthening long-term educational, labor-market, and social outcomes.

Learning on the Job. Findings from this literature offer several relevant policy recommendations for Latin America and the Caribbean, a region characterized by elevated rates of youth unemployment and inactivity, high levels of labor-market informality, and the presence of illicit economies and criminal organizations in some areas. In this context, programs that facilitate early and effective labor-market integration may generate substantial social returns.[58] Youth employment programs can also help prevent entry into criminal networks by providing legal income opportunities, structured routines, and adult supervision.

A central recommendation is to frame school-vacation youth employment programs as a violence prevention strategy rather than solely as a labor-market policy. Although the evidence indicates that

[58] As Sviatschi (2022) demonstrates, increases in the returns to illicit drug activities lead adolescents, particularly those aged 11–14, to participate more actively in illegal labor markets. This involvement adversely affects their educational trajectories and increases the likelihood of long-term criminal involvement.

the largest effects are concentrated among youth with higher *ex ante* risk, such as those with prior arrest records or greater exposure to violence, a geographically targeted approach may be more appropriate for Latin America and the Caribbean. Under this approach, programs would be concentrated in high-violence areas while prioritizing participation among the most vulnerable youth. Given that participation rates among at-risk youth may be lower in the region, program design should actively promote access through outreach in schools and communities, simplified application requirements, assistance with documentation, logistical support such as transportation and meals, and prompt resolution of operational barriers, including job placement and scheduling issues.

Regarding program design, evidence from the United States highlights the importance of ensuring minimum quality standards. Programs should provide structured employment opportunities, with clearly defined tasks, explicit rules and expectations, and relatively safe working environments. All the programs reviewed incorporate continuous adult supervision through mentors, which appears to be central to their effectiveness. Although the evidence on the additional benefits of incorporating an explicit socio-emotional skills curriculum is mixed, the overall findings suggest that behavioral changes constitute an important mechanism through which these programs generate positive outcomes. Consequently, a practical recommendation for strengthening program effects is to include a brief, applied socio-emotional learning component focusing on skills such as self-regulation, conflict resolution, and communication. Such training could be complemented by informational modules emphasizing the opportunity costs of school dropout and the individual and social consequences of criminal involvement.

Finally, to facilitate scaling across Latin America and the Caribbean, a viable approach is to implement these programs through multiple partners, including municipalities, nongovernmental organizations, private-sector employers, and public agencies. At the same time, policymakers must ensure that all implementing organizations comply with verifiable minimum standards for supervision, work structure, monitoring, and safety protocols.

In conclusion, the central message emerging from the evidence reviewed in this paper is that education can serve not only as a social policy aimed at improving learning outcomes and labor-market prospects but also as a key instrument for crime and violence prevention. Importantly, this conclusion is based exclusively on educational interventions that have been rigorously evaluated. At the same time, the review highlights significant knowledge gaps, particularly regarding the long-term effects of educational policies that could plausibly have substantial effects on criminal involvement but have not yet been studied from this perspective. Further gaps exist in the availability of comparable cost-effectiveness estimates across interventions, limiting policymakers' ability to assess the relative efficiency of alternative strategies.

In this context, integrating educational policy into comprehensive crime prevention strategies can expand its potential social benefits while creating opportunities to build safer, more equitable societies with stronger prospects for young people across the region. At the same time, advancing research on the crime-reduction effects of educational interventions, particularly through rigorous long-term evaluations and cost-effectiveness analyses, should be a priority for researchers and policymakers seeking to maximize the social returns on public investment in education.

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Table 1. Summary of Impacts of Educational Policies or Programs on Crime

Policy or program	Impact	Panel A. All studies				Panel B. Only studies that examine each outcome			
		Incarceration	Non-violent crime	Violent crime	School crime	Incarceration	Non-violent crime	Violent crime	School crime
All studies	**Reduction**	**26%**	**63%**	**58%**	**15%**	**81%**	**76%**	**69%**	**67%**
	Increase	**2%**	**7%**	**11%**	**4%**	**8%**	**9%**	**13%**	**17%**
	Not significant	**4%**	**12%**	**15%**	**4%**	**12%**	**15%**	**18%**	**17%**
	Not analyzed	**68%**	**17%**	**16%**	**78%**	**—**	**—**	**—**	**—**
	Number of studies	**81**	**81**	**81**	**81**	**26**	**67**	**68**	**18**
More Years of Education Policies That Modify the Number of Years of Schooling	Reduction	35%	76%	65%	0%	86%	87%	69%	0%
	Increase	0%	0%	6%	12%	0%	0%	6%	100%
	Not significant	6%	12%	24%	0%	14%	13%	25%	0%
	Not analyzed	59%	12%	6%	88%	—	—	—	—
	Number of studies	17	17	17	17	7	15	16	2
More Time in School Policies or Programs That Modify the Time Children and Youth Spend in School	Reduction	9%	55%	36%	0%	100%	67%	40%	0%
	Increase	0%	18%	36%	9%	0%	22%	40%	100%
	Not significant	0%	9%	18%	0%	0%	11%	20%	0%
	Not analyzed	91%	18%	9%	91%	—	—	—	—
	Number of studies	11	11	11	11	1	9	10	1
Better Quality Access to Higher-Quality Education and Improved Learning	Reduction	42%	58%	58%	33%	100%	88%	78%	80%
	Increase	0%	0%	0%	0%	0%	0%	0%	0%
	Not significant	0%	8%	17%	8%	0%	13%	22%	20%
	Not analyzed	58%	33%	25%	58%	—	—	—	—
	Number of studies	12	12	12	12	5	8	9	5
Starting from the Cradle Early Childhood Education	Reduction	25%	69%	69%	25%	67%	85%	85%	100%
	Increase	0%	6%	6%	0%	0%	8%	8%	0%
	Not significant	13%	6%	6%	0%	33%	8%	8%	0%
	Not analyzed	63%	19%	19%	75%	—	—	—	—

	Number of studies	16	16	16	16	6	13	13	4
Optimal Starting Age Policies on School-Entry Age	Reduction	25%	75%	25%	25%	100%	100%	50%	100%
	Increase	0%	0%	25%	0%	0%	0%	50%	0%
	Not significant	0%	0%	0%	0%	0%	0%	0%	0%
	Not analyzed	75%	25%	50%	75%	—	—	—	—
	Number of studies	4	4	4	4	1	3	2	1
Beyond the Traditional Curriculum Programs with Behavioral Components	Reduction	20%	60%	60%	30%	100%	67%	75%	60%
	Increase	0%	10%	10%	0%	0%	11%	13%	0%
	Not significant	0%	20%	10%	20%	0%	22%	13%	40%
	Not analyzed	80%	10%	20%	50%	—	—	—	—
	Number of studies	10	10	10	10	2	9	8	5
School Sanctions for Poor Performance or Misconduct	Reduction	0%	0%	33%	0%	0%	0%	33%	—
	Increase	67%	33%	33%	0%	100%	33%	33%	—
	Not significant	0%	67%	33%	0%	0%	67%	33%	—
	Not analyzed	33%	0%	0%	100%	—	—	—	—
	Number of studies	3	3	3	3	2	3	3	0
Economic Incentives Related to Educational Outcomes	Reduction	0%	100%	100%	0%	—	100%	100%	—
	Increase	0%	0%	0%	0%	—	0%	0%	—
	Not significant	0%	0%	0%	0%	—	0%	0%	—
	Not analyzed	100%	0%	0%	100%	—	—	—	—
	Number of studies	2	2	2	2	0	2	2	0
Learning on the Job School-Vacation Employment Programs	Reduction	33%	50%	67%	0%	100%	60%	80%	—
	Increase	0%	17%	0%	0%	0%	20%	0%	—
	Not significant	0%	17%	17%	0%	0%	20%	20%	—
	Not analyzed	67%	17%	17%	100%	—	—	—	—
	Number of studies	6	6	6	6	2	5	5	0

Source: Authors' elaboration.

Note: The table summarizes, for each type of educational policy or program, the proportion of studies finding reductions, increases, or no statistically significant effects, or not analyzing each type of crime outcome. Percentages are calculated over the total number of studies included in each category, reported in the last row of each block. In the "All studies" block, the overall total is calculated by summing the number of studies reported across the nine policy categories and dividing each result by the total number of studies included in the review. Because no study is repeated across categories, this total corresponds to the aggregate percentage of studies that report reductions, increases, or no statistically significant effects, or that do not analyze each crime outcome.

Table 2. More Years of Education: Summary of Crime Impacts from Policies That Modify the Number of Years of Schooling

Authors/year	Country	P	NVC	VC	SC	Main mechanism	Cost–benefit
Lochner and Moretti (2004)	United States	↓	↓	↓	NA	Wages/employability	Savings
Machin *et al.* (2011)	United Kingdom	NA	↓	NS	NA	Wages/employability	Savings
Anderson (2014)	United States	NA	↓	↓	NA	Incapacitation	Savings
Gilpin and Pennig (2015)	United States	NA	NS	↑	↑	Youth concentration	No
Hjalmarsson *et al.* (2015)	Sweden	↓	↓	NS	NA	Wages/employability	No
Bell *et al.* (2016)	United States	↓	↓	↓	NA	Incapacitation and some wages/employability	No
Brilli and Tonello (2018)	Italy	NA	↓	↓	↑	Incapacitation	No
Beatton *et al.* (2018)	Australia	NA	↓	↓	NA	Incapacitation	No
Cano-Urbina and Lochner (2019)	United States	NA	↓	↓	NA	Marriage (more educated partners and higher wages)	No
Bell *et al.* (2022)	United States	NA	↓	↓	NA	Direct incapacitation and dynamic incapacitation	Yes
Ahrsjö *et al.* (2026)	Sweden	↓	↓	↓	NA	Wages/employability; marriage; parental crime; better neighborhoods for treated parents	No
Gleditsch *et al.* (2022)	Mexico	NA	NA	↓	NA	Wages/employability	No
Nishijima and Pal (2023)	Brazil	NA	NS	↓	NA	Incapacitation; classroom overcrowding	No
Eriksson (2020)	United States	↓	NA	NA	NA	Wages/employability; early incapacitation; civic education	No
Bennett (2018)	Denmark	↓	↓	↓	NA	Wages/employability; incapacitation; peers	No
Buonanno and Leonida (2009)	Italy	NA	↓	NS	NA	Wages/employability; incapacitation; change in values	No
Huttunen *et al.* (2023)	Finland	NS	↓	NS	NA	Dynamic incapacitation at the extensive margin	No

Source: Authors' elaboration.

Note: The table summarizes the main results of studies on the effects on crime. It reports the year and country of the evidence, impacts by crime type, main mechanisms, and whether the study includes a cost–benefit analysis. Crime categories are prison (P), violent crime (VC), non-violent crime (NVC), and school crime (SC). Arrows indicate the direction of the effect reported by the authors. NA indicates that the outcome was not analyzed, and NS indicates that no statistically significant effects were found. The last column indicates whether the study reports costs, savings, both (Yes), or neither (No).

Table 3. More Time in School: Summary of Crime Impacts from Policies or Programs That Modify the Time Children and Youth Spend in School

Authors/year	Country	P	NVC	VC	SC	Main mechanism	Cost–benefit
Jacob and Lefgren (2003)	United States	NA	↓	↑	NA	Incapacitation; youth concentration	No
Luallen (2006)	United States	NA	↓	↑	NA	Incapacitation; concentration	No
Berthelon and Kruger (2011)	Chile	NA	↓	↓	NA	Incapacitation	Costs
Akee *et al.* (2014)	United States	NA	↑	↑	NA	Youth concentration	No
Pires and Urzúa (2015)	Chile	↓	NA	NA	NA	Incapacitation	No
Billings and Phillips (2017)	United States	NA	NS	↑	NA	Youth concentration	No
Fischer and Argyle (2018)	United States	NA	↓	NS	↑	Partial incapacitation/supervision	No
Gómez Fernández (2019)	Colombia	NA	↓	↓	NA	Incapacitation/supervision	No
Cabrera-Hernández and Zárate-Tenorio (2026)	Mexico	NA	↓	NS	NA	Incapacitation	No
Rosa *et al.* (2022)	Brazil	NA	NA	↓	NA	Incapacitation	No
Garganta *et al.* (2026)	Dominican Republic	NA	↑	↓	NA	Human capital (wages/employability); socio-emotional skills	No

Source: Authors' elaboration.

Note: The table summarizes the main results of studies on the effects on crime. It reports the year and country of the evidence, impacts by crime type, main mechanisms, and whether the study includes a cost–benefit analysis. Crime categories are prison (P), which includes being or having been deprived of liberty; violent crime (VC), which encompasses various forms of physical assault, with or without weapons; non-violent crime (NVC), which includes mainly property offenses and drug-related crimes; and school crime (SC), which corresponds to arrests or offenses occurring on school premises, excluding suspensions and bullying. Arrows indicate the direction of the effect reported by the authors. NA indicates that the outcome was not analyzed, and NS indicates that no statistically significant effects were found. The last column indicates whether the study reports costs, savings, both (Yes), or neither (No). In the studies by Luallen (2006), Akee *et al.* (2014), and Billings and Phillips (2017), the arrows reflect the effects on crime levels when classes are in session, although the originally reported results correspond to days without school; therefore, the sign of the effect is reversed in this table to maintain consistency with the rest of the studies.

Table 4. Better Quality: Summary of Crime Impacts from Attending Higher-Quality Schools

Authors/year	Country	P	NVC	VC	SC	Main mechanism	Cost–benefit
Weiner *et al.* (2009)	United States	NA	NA	↓	NA	Human capital; peers; more police	Savings
Cullen *et al.* (2006)	United States	↓	NA	NA	NA	—	Costs
Deming (2011)	United States	↓	↓	↓	↓	Combination of higher school quality and peer composition/matching. For middle school, the impact is explained to a greater extent by a better peer group; for high school, it is due to human capital, remaining on track academically, and school quality.	Savings
Billings *et al.* (2014)	United States	↓	↓	↓	NS	Segregation; peers; concentration	Costs
Dobbie and Fryer (2015)	United States	↓	NS	NS	NA	Better school quality and intensive practices; test score effects or neighborhood program effects explain only a small part.	No
McEachin *et al.* (2020)	United States	NA	↓	↓	↓	Greater school engagement; better school climate; social skills	No
Jackson *et al.* (2020)	United States	NA	NA	NA	↓	Socio-emotional well-being; hard work; human capital quality	No
Beuermann *et al.* (2023)	Trinidad and Tobago	NA	↓	↓	NA	Better multidimensional human capital (academic and non-academic dimensions)	No
Jackson *et al.* (2024)	United States	NA	NA	NA	↓	Socio-emotional well-being; hard work; human capital quality	No
Doty *et al.* (2026)	United States	↓	↓	↓	NA	Human capital; opportunity cost of crime (higher wages); transferable cognitive skills; non-cognitive skills	No
Duryea *et al.* (2025)	Brazil	NA	↓	↓	NA	Interaction between socio-economic groups; institutional quality of education received; self-regulation	No
Fajardo Vanegas (2023)	Colombia	NA	↓	NS	NA	Human capital; opportunity cost of crime (higher wages); transferable cognitive skills; non-cognitive skills	No

Source: Authors' elaboration.

Note: The table summarizes the main results of studies on the effects on crime. It reports the year and country of the evidence, impacts by crime type, main mechanisms, and whether the study includes a cost–benefit analysis. Crime categories are prison (P), violent crime (VC), non-violent crime (NVC), and school crime (SC). Arrows indicate the direction of the effect reported by the authors. NA indicates that the outcome was not analyzed, and NS indicates that no statistically significant effects were found. The last column indicates whether the study reports costs, savings, both (Yes), or neither (No). In the studies by Cullen *et al.* (2006), Dobbie and Fryer (2015), and Jackson *et al.* (2020, 2024), crime impacts are based on student self-reports. Cullen *et al.* (2006) find a reduction in the probability of incarceration but do not report results disaggregated by crime type, nor do they present information on arrests or school crime. Billings *et al.* (2014) analyze the impact of the elimination of busing on crime. Greater school segregation increases crime by reassigning students to schools with a higher proportion of minority students. To maintain comparability in the table, the result is reported as a reduction in crime when students attend "better" schools. Additionally, the authors find significant reductions in arrests but do not distinguish by crime type (violent vs. non-violent); reductions in both violent and non-violent crime are therefore recorded in the table. Unlike the other studies analyzed in this paper, Duryea *et al.* (2025) and Fajardo Vanegas (2023) estimate the impact of access to high-quality tertiary education institutions.

Table 5. Starting from the Cradle: Summary of Impacts from Early Childhood Programs

Authors/year	Country	P	NVC	VC	SC	Main mechanism	Cost–benefit
Garces *et al.* (2002)	United States	NA	↓	↓	NA	Human capital; accompaniment; spillovers from older to younger siblings	Costs
Deming (2009)	United States	NS	NA	NA	NA	Human capital; family environment	Yes
Carneiro and Ginja (2014)	United States	NA	↓	↓	NA	Marginal improvements in parental investment among eligible households. The authors do not mention other channels, as the absence of impacts on graduation or test scores suggests that human capital is not the relevant channel.	Yes
Johnson and Jackson (2019)	United States	↓	NA	NA	NA	Dynamic complementarity: Head Start improves school readiness and increases the productivity of K–12 investment.	No
Barr and Gibbs (2022)	United States	NA	↓	↓	NA	Mother's human capital	No
Anders *et al.* (2023)	United States	NA	↓	↓	NA	Development of non-cognitive skills/self-regulation and a better caregiving environment and supports; crime effects are larger than gains in primary school test scores would predict.	No
Heckman *et al.* (2010)	United States	NS	↓	↓	↓	Human capital; emotional regulation; parental involvement	Yes
Heckman *et al.* (2013)	United States	NA	↓	↓	NA	Emotional regulation is the most important channel and explains a large share of nearly all impacts (20%–60% for men and 40%–60% for women). Academic motivation explains impacts on academic outcomes, with cognitive skills particularly important for women.	No
Schweinhart (2013)	United States	↓	↓	↓	↓	The main channel of long-term impacts is human capital development, although the author mentions that crime effects may also be related to non-cognitive skills and impulse control.	Yes
Baker *et al.* (2019)	Canada	NA	↑	↑	NA	The main channel of impact is deterioration in non-cognitive skills due to a low-quality program.	No
García *et al.* (2023)	United States	NA	↓	↓	↓	Better home environment driven especially by improved parenting practices and reduced criminal involvement among the first generation of treated men.	Yes
Campbell *et al.* (2012)	United States	NA	NS	NS	NA	Finding no impacts, the authors do not analyze mechanisms but suggest that the project focused on academic topics and that a possible explanation is the absence of a parental intervention component.	Yes
Reynolds *et al.* (2001)	United States	NA	↓	↓	NA	Although the authors do not conduct a formal analysis, they suggest that gains in cognitive skills combined with greater parental involvement lead to higher human capital and, in turn, better emotional regulation.	No
Reynolds *et al.* (2011)	United States	↓	↓	↓	NA	The authors analyze five mediators: human capital, social adjustment, motivation, and parental and school involvement in improving behavior. Together these explain around 60% of the observed preschool impacts.	No
Brutti and Montolio (2021)	Spain	NA	↓	↓	NA	Although the authors do not conduct a formal analysis of mechanisms, they suggest that, because the reduction in crime is concentrated in drug offenses and violent crime, the channel is likely improved non-cognitive skills, such as self-regulation.	Yes
Gray-Lobe *et al.* (2023)	United States	↓	NA	NA	↓	The authors do not analyze mechanisms but motivate the analysis with behavioral outcomes as non-cognitive impacts.	No

Source: Authors' elaboration.

Note: The table summarizes the main results of studies on the effects on crime. It reports the year and country of the evidence, impacts by crime type, main mechanisms, and whether the study includes a cost–benefit analysis. Crime categories are prison (P), violent crime (VC), non-violent crime (NVC), and school crime (SC). Arrows indicate the direction of the effect reported by the authors. NA indicates that the outcome was not analyzed, and NS indicates that no statistically significant effects were found. The last column indicates whether the study reports costs, savings, both (Yes), or neither (No).

Table 6. Optimal Starting Age: Summary of Impacts from Minimum School-Entry-Age Laws

Authors/year	Country	P	NVC	VC	SC	Main mechanism	Cost–benefit
Cook and Kang (2016)	United States	NA	↓	↑	↓	Human capital (quality and quantity; dropout)	No
Depew and Eren (2016)	United States	NA	↓	NA	NA	Quality (better academic performance among females)	No
McAdams (2016)	United States	↓	NA	NA	NA	Human capital; peers; incapacitation	No
Landersø *et al.* (2017)	Denmark	NA	↓	↓	NA	Incapacitation	No

Source: Authors' elaboration.

Note: The table summarizes the main results of studies on the effects on crime. It reports the year and country of the evidence, impacts by crime type, main mechanisms, and whether the study includes a cost–benefit analysis. Crime categories are prison (P), violent crime (VC), non-violent crime (NVC), and school crime (SC). Arrows indicate the direction of the effect reported by the authors. NA indicates that the outcome was not analyzed, and NS indicates that no statistically significant effects were found. The last column indicates whether the study reports costs, savings, both (Yes), or neither (No).

Table 7. Beyond the Traditional Curriculum: Summary of Crime Impacts from Programs with Behavioral Components

Authors/year	Country	P	NVC	VC	SC	Main mechanism	Cost–benefit
Rodríguez-Planas (2012)	United States	NA	↑	↑	NA	Improvement in non-cognitive socio-emotional skills (mentors weakened the deterrent effect of sanctions)	No
Heller *et al.* (2013)	United States	↓	↓	↓	NS	Improvement in non-cognitive skills (↓ automaticity)	Yes
Heller *et al.* (2017)	United States	↓	↓	↓	NA	Change in impulsive decision-making patterns (↓ automaticity)	Yes
Dinarte (2017)	El Salvador	NA	↓	↓	↓	Supervision; emotional regulation; peer influence	No
Dinarte-Diaz and Egaña-delSol (2024)	El Salvador	NA	↓	↓	↓	Supervision; emotional regulation	No
Abdul-Razzak and Hallberg (2024)	United States	NA	NS	↓	NA	Improvement in non-cognitive skills (emotional regulation, decision-making, trauma management)	Costs
Grossman and Tierney (1998)	United States	NA	NS	NA	NA	Mentoring	No
Rollin *et al.* (2003)	United States	NA	NA	NA	↓	Social skills; mentoring	No
Spruit *et al.* (2018)	Netherlands	NA	↓	↓	NA	—	No
Hartmann and Depro (2006)	United States	NA	↓	NS	NS	—	No

Source: Authors' elaboration.

Note: The table summarizes the main results of studies on the effects on crime. It reports the year and country of the evidence, impacts by crime type, main mechanisms, and whether the study includes a cost–benefit analysis. Crime categories are prison (P), violent crime (VC), non-violent crime (NVC), and school crime (SC). Arrows indicate the direction of the effect reported by the authors. NA indicates that the outcome was not analyzed, and NS indicates that no statistically significant effects were found. The last column indicates whether the study reports costs, savings, both (Yes), or neither (No). In the studies by Dinarte (2017) and Dinarte-Diaz and Egaña-delSol (2024), crime impacts are based on student self-reports and violent actions.

Table 8. School Sanctions: Summary of Impacts from School Sanctions for Poor Performance or Misconduct

Authors/year	Country	P	NVC	VC	SC	Main mechanism	Cost–benefit
Eren *et al.* (2017)	United States	NA	NS	4th grade: NS; 8th grade (summer school): ↓; 8th grade (grade retention): NS	NA	Human capital: better academic performance owing to summer school	Costs
Eren *et al.* (2022)	United States	↑	NS	↑	NA	Lower human capital (cognitive and non-cognitive) caused by absenteeism, higher school dropout, and changes in school and peer environments, reflected at the end of primary and secondary education in a higher probability of suspension and criminal activity.	Costs
Bacher-Hicks *et al.* (2024)	United States	↑	↑	NS	NA	Lower educational continuity; changes in school leadership; school climate and ties with families/community	No

Source: Authors' elaboration.

Note: The table summarizes the main results of studies on the effects on crime. It reports the year and country of the evidence, impacts by crime type, main mechanisms, and whether the study includes a cost–benefit analysis. Crime categories are prison (P), violent crime (VC), non-violent crime (NVC), and school crime (SC). Arrows indicate the direction of the effect reported by the authors. NA indicates that the outcome was not analyzed, and NS indicates that no statistically significant effects were found. The last column indicates whether the study reports costs, savings, both (Yes), or neither (No).

Table 9. Economic Incentives: Summary of Impacts from Economic Incentives Related to Educational Outcomes

Authors/year	Country	P	NVC	VC	SC	Main mechanism	Cost–benefit
Chioda *et al.* (2016)	Brazil	NA	↓	↓	NA	Lower economic incentive for crime; more supervision; support networks (not incapacitation)	Costs
Attanasio *et al.* (2021)	Colombia	NA	↓	↓	NA	Human capital explains 25%; the authors mention that other mechanisms, such as improvements in the family environment or higher income, could also contribute.	Costs

Source: Authors' elaboration.

Note: The table summarizes the main results of studies on the effects on crime. It reports the year and country of the evidence, impacts by crime type, main mechanisms, and whether the study includes a cost–benefit analysis. Crime categories are prison (P), violent crime (VC), non-violent crime (NVC), and school crime (SC). Arrows indicate the direction of the effect reported by the authors. NA indicates that the outcome was not analyzed, and NS indicates that no statistically significant effects were found. The last column indicates whether the study reports costs, savings, both (Yes), or neither (No).

Table 10. Learning on the Job: Summary of Impacts from School-Vacation Employment Programs

Authors/year	Country	P	NVC	VC	SC	Main mechanism	Cost–benefit
Heller (2014)	United States	NA	NS	↓	NA	Socio-emotional skills and self-regulation; mentoring	Costs
Gelber *et al.* (2016)	United States	↓	NA	NA	NA	Improvements in socio-emotional skills and employer networks; some incapacitation	Yes
Modestino (2019)	United States	NA	↓	↓	NA	Socio-emotional skills; short-term incapacitation	Yes
Davis and Heller (2020)	United States	NA	↑ (property); ↓ (drugs)	↓	NA	Socio-emotional skills and self-regulation; networks and peers	Yes
Heller (2022)	United States	↓	↓	NS	NA	Incapacitation; socio-emotional skills and self-regulation; supervision; peer networks; economic incentive	Costs
Kessler *et al.* (2022)	United States	NA	↓	↓	NA	Incapacitation; supervision; reduced contact with the police and justice system; prosocial image	Yes

Source: Authors' elaboration.

Note: The table summarizes the main results of studies on the effects on crime. It reports the year and country of the evidence, impacts by crime type, main mechanisms, and whether the study includes a cost–benefit analysis. Crime categories are prison (P), violent crime (VC), non-violent crime (NVC), and school crime (SC). Arrows indicate the direction of the effect reported by the authors. NA indicates that the outcome was not analyzed, and NS indicates that no statistically significant effects were found. The last column indicates whether the study reports costs, savings, both (Yes), or neither (No).

Table 11. Mechanisms Explaining the Impacts of Educational Policies or Programs

Mechanisms	Total studies	More years of education	More time in school	Better quality and learning	Early childhood education	School-entry-age policies	Extracurricular programs with behavioral components	School sanctions	Economic incentives (CCTs)	School-vacation employment
1. Human capital: quantity (wages/employability)	35%	53%	9%	33%	50%	50%	0%	100%	50%	0%
2. Human capital: quality	14%	0%	0%	67%	0%	50%	0%	33%	0%	0%
3. Incapacitation/supervision	33%	65%	64%	0%	0%	50%	20%	0%	50%	67%
4. Socio-emotional skills	38%	12%	9%	33%	56%	0%	80%	33%	50%	83%
5. Marriage market	2%	12%	0%	0%	0%	0%	0%	0%	0%	0%
6. Peers/concentration	21%	18%	36%	33%	0%	25%	10%	33%	0%	50%
7. Intergenerational (better parenting skills/less crime)	14%	6%	0%	0%	56%	0%	0%	0%	50%	0%
Total studies	**81**	**17**	**11**	**12**	**16**	**4**	**10**	**3**	**2**	**6**

Source: Authors' elaboration.

Note: The table reports, for each type of policy or program, the percentage of studies reviewed that mention each channel as an explanatory mechanism of the estimated effects on crime. Because a single study can refer to more than one mechanism, proportions within each column do not sum to 100%. The "Total studies" column summarizes the proportion of all 81 studies reviewed that identify each channel, and the last row reports the number of studies included in each category. Mechanisms were coded from the authors' explicit interpretation.

Table 12. Evidence on Costs, Benefits, and Geographic Origin

	Total studies	More years of education	More time in school	Better quality and learning	Early childhood education	School-entry-age policies	Extra-curricular programs with behavioral components	School sanctions	Economic incentives (CCTs)	School-vacation employment
Cost–benefit analysis										
Analysis of savings to society	6%	18%	0%	17%	0%	0%	0%	0%	0%	0%
Costs	14%	0%	9%	17%	6%	0%	10%	67%	100%	33%
IRR/benefit–cost ratio	19%	6%	0%	0%	50%	0%	20%	0%	0%	67%
None	65%	76%	82%	67%	44%	100%	70%	100%	100%	0%
Geographic location of evidence										
United States	67%	41%	45%	75%	88%	75%	70%	100%	0%	100%
Europe	12%	41%	0%	0%	6%	25%	10%	0%	0%	0%
Latin America and the Caribbean	19%	12%	55%	25%	0%	0%	20%	0%	100%	0%
Other	2%	6%	0%	0%	6%	0%	0%	0%	0%	0%
Total studies	**81**	**17**	**11**	**12**	**16**	**4**	**10**	**3**	**2**	**6**

Source: Authors' elaboration.

Note: The table presents, for each type of educational policy or program, the proportion of studies reporting some dimension of economic analysis—social savings from crime reduction, program costs, or internal rates of return (IRR)/benefit–cost ratios—as well as the geographic distribution of the evidence reviewed. Percentages are calculated over the total number of studies included in each category, reported in the last row. The "Total studies" column reports the corresponding proportions for all 81 studies reviewed.

Appendix A. Methodology

The identification and selection of studies included in this review focused on building a synthesis framework useful for public policy, which would systematize: (i) the causal impacts of different educational interventions on criminal involvement; (ii) the main mechanisms explaining these impacts; and (iii) when evidence allows, findings on cost-effectiveness. For this purpose, only relatively recent studies, published in the last 30 years (through August 2026), that estimated causal effects of educational policies or interventions using rigorous empirical strategies were included.

The article selection process was divided into three stages. In the first, given the volume of existing evidence, two of the most comprehensive and widely cited systematic reviews on education and crime were used as starting points to maximize coverage of recent and influential studies: the exhaustive review by Bagby *et al.* (2021) and that of Machin and Sandi (2025). These were supplemented by two thematic reviews specific to Latin America: Abt *et al.* (2018), which examines interventions to prevent youth violence in Mexico, and Alarcón and Sviatschi (n.d.), focused on the recruitment of children and adolescents by organized crime in the region.

In the second stage, the search was expanded to university repositories, regional sources, and academic databases, including JSTOR, Taylor & Francis, and Elsevier, to identify additional studies for Latin America and Europe, as well as recent studies not included in prior reviews. No geographic, language, or publication-type restrictions were applied. Selection was based on the track record of researchers or research centers, the strength of the identification strategy, and the relevance of the variables of interest. These two initial stages yielded 496 articles on the effects of different educational interventions on crime-related variables.

In the third stage, the review selected the final group of studies based on two conditions that had to be met simultaneously. First, they needed to analyze variables measuring criminality, excluding studies that only reported intermediate outcomes or potential predictors of crime, such as socio-emotional skills, risk behaviors, domestic violence, or bullying. Although these outcomes may predict criminality in some contexts, the review focused on four types of outcomes: incarceration, probability of committing violent and non-violent offenses, and measures of school-based crime. Violent offenses include various forms of physical assault, with or without weapons; non-violent offenses primarily comprise property crimes and drug-related offenses; and school crime refers to arrests or offenses occurring within educational facilities, excluding suspensions and bullying.[59]

[59] Näslund-Hadley *et al.* (2026) present evidence from 88 impact evaluations of school-delivered behavioral violence prevention interventions aimed at preventing behavioral forms of violence, including bullying, violence against girls, and verbal aggression, among other outcomes.

Second, studies needed a robust identification strategy that allowed results to be interpreted as causal, prioritizing studies with randomized experimental and quasi-experimental designs. Eighty-one studies passed the final filter and were analyzed in detail to extract the main impacts on the four selected crime measures, causal mechanisms, available evidence on cost-effectiveness, and implementation context.

The selected studies were grouped into nine categories: (i) policies aimed at increasing years of education in the population; (ii) policies or programs that modify the time children and youth spend in school; (iii) access to higher-quality education and improved learning; (iv) early childhood education programs; (v) policies that modify the school entry age; (vi) extracurricular programs with behavioral components; (vii) school-vacation youth employment programs; (viii) school sanctions for poor performance or misconduct; and (ix) economic incentives related to educational outcomes, such as CCTs.

This classification also implies that several interventions were excluded from the review. In some cases, these are common policies with positive effects on educational outcomes, but for which no causal evidence yet exists on their direct impact on crime—as is the case with school meal programs, infrastructure improvements, or interventions aimed at reducing bullying. In addition, programs implemented in the school environment that do have crime-related evidence but are not properly educational in nature were excluded, such as those based on increased police presence or the use of cameras within schools.

For each of the nine categories, synthesis tables were prepared to accompany the description of the reviewed studies. In addition, to facilitate comparative analysis across categories, the paper draws on three cross-cutting tables that summarize the direction and consistency of impacts, the main mechanisms identified in the literature, and available evidence on costs, benefits, and geographic origin. On this basis, the main text presents a comparative synthesis of the evidence for the nine policy categories, organized around impacts, mechanisms, and economic evidence.[60]

[60] Likewise, for interested readers, an additional table consolidating the universe of identified studies can be made available.