From Friends to 'Family': Schools, Neighborhoods, and Gang Recruitment*

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Abstract

This paper studies how gang influence spreads through family and peer networks, and how exposure to peers with family connections to gangs contributes to gang expansion. I combine novel Swedish police data on gang members with administrative records on family links, schools, neighborhoods, crime, education, and health. I define gateway (GW) peers as students whose relatives have prior gang-related offending. Using male students in grade 7, I leverage cohort-to-cohort variation in exposure to GW peers in schools and neighborhoods. I find that exposure to GW peers increases the probability of being listed as a gang member. A 5 percentage point increase in exposure to GW peers with older brothers who have prior gang-related offending raises the probability of gang listing by about 14 percent relative to the mean. I find no corresponding effects for exposure to peers whose older brothers have prior criminal offending that is not gang-related. Additional evidence points to a recruitment-based mechanism. Co-offending patterns extend beyond GW peers to their older brothers and other gang members, and the effects weaken when the older brother is incarcerated, lives elsewhere, or is older than the typical recruiter age range. The effects are nonlinear and concentrated among disadvantaged students, while spillovers to female students appear in adolescent mental health rather than crime.

Keywords: gangs, recruitment, family transmission, peer networks, schools, neighborhoods
JEL Classification: K42, J13, I24, C31

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1 Introduction

Organized criminal groups require a steady flow of new recruits to sustain their operations. Adolescents are a natural source of such recruits, and neighborhoods and schools are the environments in which contact is most likely to occur. A broad literature shows that social interactions in these settings shape educational and criminal outcomes.[1] Yet we know much less about how local peer environments connect adolescents to organized criminal networks. Entry into organized crime may depend not only on exposure to delinquent peers, but also on exposure to peers who provide access to older individuals who are already connected to such networks.

Neighborhoods and schools may shape this process through distinct forms of social exposure. Neighborhoods shape the set of peers adolescents are likely to interact with early in life, giving rise to ties that remain relevant for much of their upbringing and are not restricted to the same age. Schools, by contrast, recompose peer groups by bringing together youths from different local backgrounds and generating repeated interactions among same-age peers. Schools may therefore create exposure to peers and social environments that would not arise through residential proximity alone. Comparing neighborhoods and schools can thus help distinguish exposure rooted in persistent local proximity from exposure generated when institutions reshape adolescents' peer groups.

This paper studies how youth exposure in neighborhoods and schools to what I term *gateway peers* (GW peers) affects an individual's later gang-related outcomes. GW peers are peers whose relatives have prior gang-related offending, which I define to be offending patterns common among individuals identified by the police as gang involved. Such peers may matter not only because they come from more disruptive or crime-prone family environments, but also because their family ties provide access to older individuals connected to criminal networks. This mechanism is likely to differ across types of relatives. Older brothers are especially salient because they are closer in age and more likely to provide direct links to active networks. More distant or older relatives may still proxy for family disadvantage or criminal background, but they are less likely to provide the same type of direct access. The paper asks whether exposure to GW peers increases later gang-related offending and listing in Sweden's Gang Register, and whether the resulting pattern is more consistent with network access than with a broader delinquent peer effect.

Two developments make Sweden an especially informative setting for these questions. First, gang-related crime has risen sharply over the past two decades, and concerns about

[1] A large literature studies peer effects in educational settings; see, for example, Angrist and Lang (2004), Bifulco et al. (2011), Carrell et al. (2009), Carrell and West (2010), Hoxby (2000), Imberman et al. (2012), Kristoffersen et al. (2015), Lavy and Schlosser (2011), Lefgren (2004), Ohinata and van Ours (2013), and Sacerdote (2001). Related work studies peer effects on crime and disruptive behavior in neighborhoods, schools, and other settings; see, for example, Billings et al. (2019), Billings and Schnepel (2020), Billings and Hoekstra (2023), Carrell et al. (2018), Carrell and Hoekstra (2010), Deming (2011), Dustmann et al. (2023), Gupta et al. (2022), Kim and Fletcher (2017), Larsen and Kristensen (2017), and Ludwig and Kling (2007).

youth recruitment have become increasingly prominent. Descriptive accounts suggest that many gangs are rooted in extended families and rely on age-structured recruitment, with older members drawing in younger teenagers and, in some cases, children.[2] Consistent with this broader development, youth involvement in gang-relevant offenses has increased markedly. The share of 18–24-year-olds suspected of narcotics offenses is now roughly three times its level twenty years ago, and among 15–17-year-olds it is roughly four times as high, while suspicions for murder or attempted murder also rose sharply between 2013 and 2023.[3] Although overall homicide rates remain low relative to the Americas (UNODC 2023), the growth of narcotics trafficking, contract killings, and credible reports of foreign state involvement have raised broader concerns about the expansion of organized criminal activity in Western Europe (Göteborgs universitet 2023; Krüsselmann et al. 2023; Polismyndigheten 2021, 2025; Rostami and Mondani 2023; Suonpää et al. 2024; Säkerhetspolisen 2024).[4]

Second, Sweden is unusually well suited for studying these questions because recent efforts to map organized criminal networks have generated police data that can be linked to population-wide administrative registers. I combine records on individuals listed in the Gang Register with detailed information on convictions and suspicions, family links, school enrollment, neighborhood residence, education, and health. Thus, I can identify: (i) gang-listed individuals, (ii) parents, siblings, uncles, aunts, and cousins of gang-listed individuals, and (iii) students whose peers have relatives with prior gang-related offending. This structure allows me to study family clustering in gang-related behavior and, more importantly, to construct peer exposure measures based on peers' family ties rather than on peers' own behavior.

The paper asks whether exposure to GW peers during adolescence increases later gang-related offending and Gang Register listing. To answer this question, I first use the police data to characterize the offending patterns of listed individuals and to construct a broader measure of prior gang-related offending in the population. I then examine how gang-related behavior clusters across family ties and whether peers linked through different relatives differ in their own later Gang Register listing. These patterns motivate the definition of GW peers by relative type and clarify which ties are most likely to provide direct links to criminal networks. The empirical analysis then estimates how exposure to these peers in schools and neighborhoods affects later outcomes and assesses whether the resulting pattern is more consistent with network access and recruitment dynamics than with a broader delinquent peer effect.

The empirical analysis focuses on exposure within school-grade and neighborhood-grade peer groups during compulsory school. Exposure is measured as the share of peers whose

[2]Some groups reportedly return to former schools to identify receptive recruits (SVT 2025).

[3]See Figure A1 and Figure A2 for gang-related crime trends since the 2000s. The murder-suspicion rate among 15–17-year-olds was near zero in 2013; the large percentage increase reflects a rise from a low baseline.

[4]See Figure A3 for trends in interpersonal violence in Europe.

older brother, father, uncle, or cousin has prior gang-related offending. I focus on male students in grade 7, a stage at which many Swedish students enter a new school environment and recruitment into gang activity often begins (Brottsförebyggande rådet 2023). The research design uses cohort-to-cohort variation in GW exposure within the same local environment, following the logic of Hoxby (2000). Because exposure is determined by older relatives' prior behavior rather than peers' contemporaneous behavior, it is not mechanically affected by the focal student's own behavior, which helps address the reflection problem that often complicates peer settings (Manski 1993; Moffitt 2001). The identifying variation from cohort-to-cohort differences (i) is not systematically related to predetermined student characteristics as would be expected under selection into schools or neighborhoods, (ii) resembles simulated random cohort composition within local environments, and (iii) is not driven by endogenous school or residential mobility.

I find that exposure to GW peers increases gang-related offending and Gang Register listing, with the strongest effects concentrated in a particular setting and relative type — school-based exposure to GW peers linked through older brothers. Specifically, a 5 percentage point increase in such exposure raises the probability that a male student is later listed in the Gang Register by about 14 percent relative to the mean. A simple back-of-the-envelope calculation suggests that this channel may account for about 30 percent of males listed in the Gang Register in the relevant birth cohorts who had no relative with prior gang-related offending. Exposure linked through older brothers emerges as the dominant margin, whereas exposure defined by fathers, uncles, or cousins shows little evidence of increasing subsequent gang-related outcomes. This aligns with the view that brothers are closer in age and more likely to move in overlapping social environments, making them more likely conduits to active criminal networks than older or more distant relatives. In neighborhoods, the relevant peer environment appears to extend beyond the same-age cohort, which likely attenuates estimates based on neighborhood-grade exposure alone.

This pattern does not extend to exposure to peers connected through non-gang-related criminal activity, for which I find no corresponding effects on subsequent crime outcomes. The effects are larger in places where gangs are more likely to be active and when GW peers appear socially closer to the focal student. Exposure also extends beyond crime, lowering educational performance and worsening adolescent mental health. To examine how these effects translate into realized interactions, I study co-offending patterns among exposed students. Exposure increases not only co-offending with GW peers, but also co-offending with their older brothers and with other individuals listed in the Gang Register, consistent with exposure connecting students to broader networks beyond their immediate peers.

This paper contributes to several strands of literature. First, it contributes to the growing body of work on gangs and organized crime and their broader societal impacts. Much of this literature focuses on the Italian Mafia and its influence on economic outcomes, firm behavior, and political institutions (e.g., Acemoglu et al. 2019; Barone and Narciso 2015;

Campedelli et al. 2024; Daniele and Dipoppa 2017; De Feo and De Luca 2017; Pinotti 2015); on Latin American cartels and the effects of narcotics trafficking, violence, and forced migration (e.g., Carvalho and Soares 2016; Dell 2015; Melnikov et al. 2020; Monteiro and Rocha 2017; Sobrino 2020; Sviatschi 2022a,b); and on gangs in relation to prisons, guns, and drugs in the US (e.g., Bruhn 2021; Cook et al. 2007; Dooley et al. 2014; Grogger 2002; Levitt and Venkatesh 2000; Skarbek 2010). I contribute to this literature by studying one mechanism through which organized criminal groups may sustain and expand themselves over time. Rather than focusing on the downstream consequences of already established criminal organizations, the paper examines how new cohorts may be drawn into gang-linked networks through socially proximate peers in ordinary adolescent settings. In particular, it shows that exposure is most relevant when peers are connected to older criminal networks through family ties that are close enough in kinship, age, and social environment to plausibly operate as intermediary recruitment links.

Second, the paper contributes to the literature on criminal peer effects within and beyond schools and neighborhoods, and more broadly to research on peer effects in educational settings (e.g., Carrell et al. 2009; Hoxby 2000; Sacerdote 2001), as well as in criminal contexts such as prisons (Bayer et al. 2009; Damm and Gorinas 2020; Johnsen and Khoury 2024; Ouss 2011; Philippe 2024; Stevenson 2017), neighborhoods (Billings et al. 2019; Billings and Schnepel 2020; Damm and Dustmann 2014; Dustmann and Landersø 2021; Dustmann et al. 2023), and schools (Billings and Hoekstra 2023; Carrell et al. 2018; Carrell and Hoekstra 2010; Gupta et al. 2022; Kim and Fletcher 2017; Larsen and Kristensen 2017). This literature shows that peers can shape criminal and other disruptive behavior in a range of environments. I identify a more specific margin of peer influence: peers matter not only because of their own behavior, but also because some peers provide access to older criminal networks outside the contemporaneous peer group. The results show that this margin is concentrated in schools, stronger for gang-linked than for broader crime outcomes, and especially pronounced for peers whose older brothers have prior gang-related offending. In that sense, the paper distinguishes between delinquent peer exposure more broadly and peer exposure that plausibly opens access to organized criminal groups.

Third, the paper contributes to the literature on the intergenerational transmission of criminal capital and on youths' indirect exposure to the justice system (Besemer and Farrington 2012; Bhuller et al. 2018; Eriksson et al. 2016; Finlay et al. 2023; Grönqvist et al. 2024; Hjalmarsson and Lindquist 2012; Junger et al. 2013; Murray and Farrington 2008; Norris et al. 2021). Previous studies largely focus on parent-to-child transmission, sibling correlations, or children's direct exposure to parental justice involvement. By linking individuals to a broader set of relatives — including fathers, older brothers, uncles, and older cousins — I show that not all family ties are equally informative about the kinds of peer environments that matter for later gang involvement. This makes it possible to trace how gang-related behavior clusters across family networks and how those networks spill

over into school and neighborhood peer environments. More broadly, the paper shows that family connections may shape adolescents' outcomes not only through direct within-family transmission, but also indirectly by determining which peers are positioned to link younger cohorts to organized criminal networks.

The rest of the paper proceeds as follows. Section 2 provides institutional context on gang networks in Sweden and the structure of compulsory schooling and neighborhoods. Section 3 describes the data and sample construction. Section 4 presents descriptive evidence on gang-involved individuals and documents family patterns in gang-related behavior. Section 5 outlines the empirical design and identifying assumptions. Section 6 presents the main results and Section 7 the evidence on mechanisms. Section 8 concludes.

2 Institutional Setting

2.1 Gangs and Recruitment Channels in Sweden

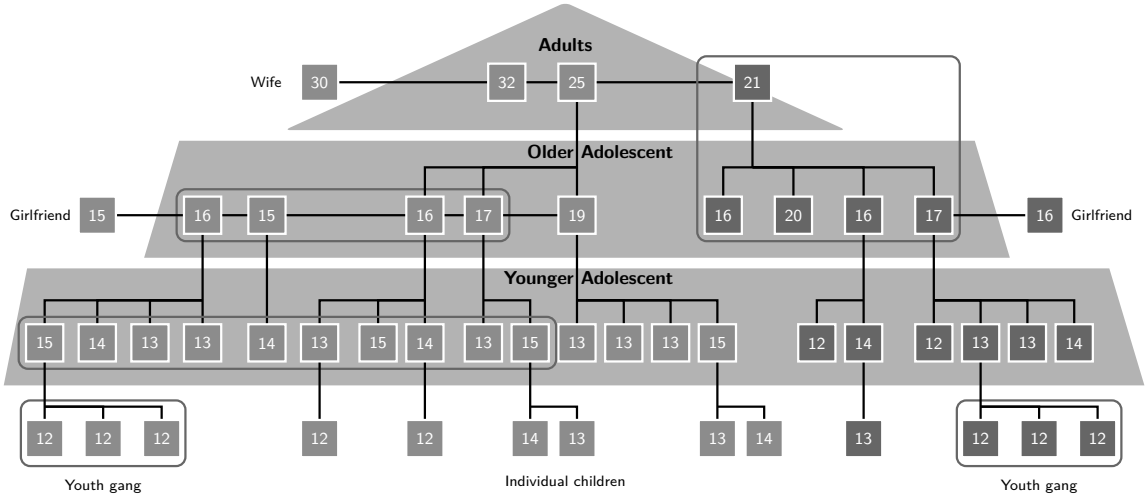
Criminal networks in Sweden are organized as decentralized social networks that combine age-based peer groups with family ties connecting individuals across age cohorts. This subsection summarizes evidence on this structure based on reports from the Swedish National Council for Crime Prevention (Brå) (Brottsförebyggande rådet 2016, 2021a,b, 2023, 2024a,b) and research by Swedish sociologists and criminologists (e.g., Gerell et al. 2020, 2021; Rostami and Mondani 2023; Sturup et al. 2019; Öberg 2015; Örnlind and Forkby 2025).

Since the early 2000s, the structure of organized crime in Sweden has shifted away from hierarchical organizations such as motorcycle gangs toward more decentralized networks rooted in socially disadvantaged neighborhoods. Early studies described these groups as family- or friendship-based networks in which recruitment frequently occurred through relatives (Brottsförebyggande rådet 2016; Gerell et al. 2020). Although kinship ties remain present in many groups, recruitment has gradually broadened to include individuals connected through local social networks.

Panel A of Figure 1 illustrates how Brå (Brottsförebyggande rådet 2023) describes the organization of these networks. Each box represents an individual, with the number indicating their age. A small number of adult leaders coordinate operations through hierarchical links to older adolescents. These individuals both participate in criminal activities and maintain connections to younger adolescents who perform lower-level tasks. Within each age group, individuals form clusters that operate as gangs. These clusters largely consist of individuals of similar age, although links across age groups are common. Groups that appear separate geographically may therefore form part of a larger criminal network connected through interpersonal ties.

Panel B of Figure 1 presents a subgraph of individuals listed in the police gang register (the underlying data are discussed further in Section 3). Each node represents an indi-

(a) Illustration of Gang Structure



(b) Subgraph of Observed Gang Network

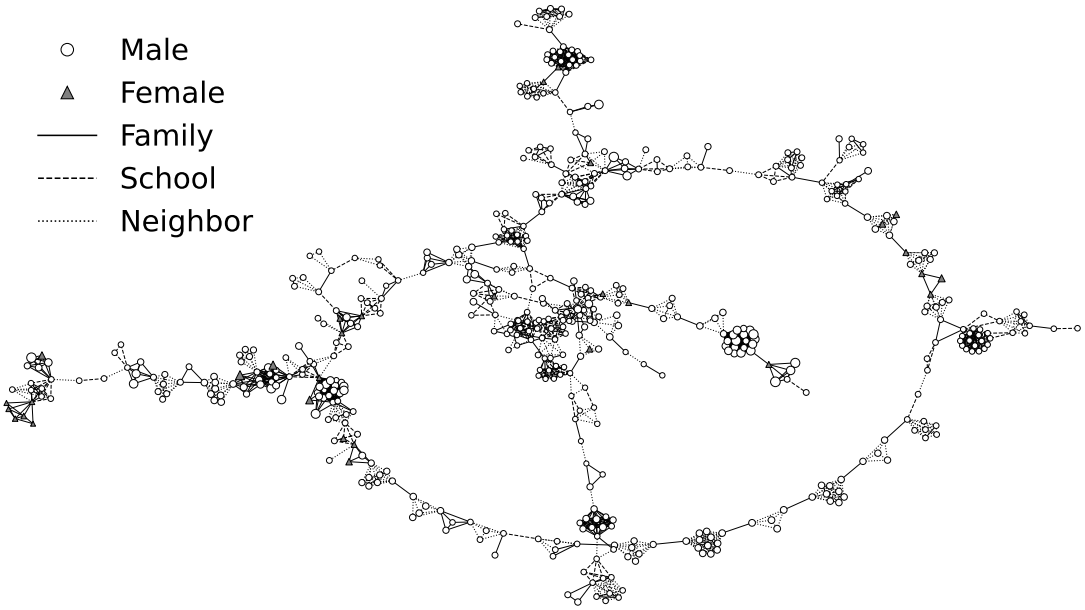


Figure 1: Conceptual and Observed Gang Networks

Note.— Panel A reproduces a conceptual illustration of the age structure and connections within gangs in Sweden, as described in Brottsförebyggande rådet (2023). Each box represents an individual, and the number indicates age. Panel B shows a network of identified gang members constructed from administrative data. Each node represents an individual; node shape indicates gender, node size reflects birth year (larger nodes correspond to older individuals), and links denote family (solid), school (dashed), and neighborhood (dotted) ties.

vidual; node shape indicates gender, node size reflects birth year (larger nodes correspond to older individuals), and links denote connections that are either family-based (solid), school-based (dashed), or neighborhood-based (dotted). Individuals are linked if they are relatives, attended the same compulsory school, or lived in the same neighborhood. The network structure suggests that family ties often connect otherwise separate groups of individuals. Nodes linked through family relationships exhibit substantially higher betweenness centrality than other nodes, meaning they lie on a large share of shortest paths between distant parts of the network. On average, these nodes are about seven times more likely to lie on a shortest path between two others than nodes without family ties (mean betweenness centrality: family = 36,125; non-family = 5,184).[5]

This pattern suggests that family links may act as bridges between otherwise disconnected parts of the network, facilitating information flow and social contact across groups. Consistent with the conceptual structure illustrated in Panel A, these links may connect individuals across age groups through kinship ties, whereas links in schools and neighborhoods primarily connect individuals of similar age and form the environments in which groups perceived as gangs emerge.

Recruitment into criminal networks often begins with low-level tasks linked to local drug markets. Criminal groups demand expendable participants willing to take risks, and younger individuals are frequently used to carry out tasks that expose them to law enforcement. Historically, minors faced relatively lenient sentencing,[6] which created incentives to recruit adolescents into criminal operations. Recruitment commonly begins with compensated tasks such as storing drugs or transporting goods and can escalate into more serious offenses. According to Brottsförebyggande rådet (2023), older teenagers (ages 16–20) actively recruit children as young as 12 to 15, generating age-structured recruitment chains in which each cohort draws in younger participants.

The expansion of these networks has coincided with a sharp increase in firearm violence. Sweden now stands out in Europe for rising gun homicide rates driven primarily by young men in disadvantaged neighborhoods. Research attributes much of this increase to conflicts between criminal groups, where shootings often trigger retaliatory attacks and cycles of violence (Gerell et al. 2021; Sturup et al. 2019). Similar dynamics have been documented in other gang settings, where violence spreads through network-based retaliation (Papachristos et al. 2012). Participation in violent acts may also increase an individual's status within criminal networks (Jönsson and Nilsson 2019).

These features suggest that exposure to criminal networks may occur not only through direct family ties but also through school and neighborhood peers whose relatives are already involved in such networks.

[5]Non-standardized betweenness centrality is defined as the number of distinct shortest paths between all ordered pairs of nodes that pass through the focal node.

[6]In January 2022, the Swedish government eliminated sentencing leniency for individuals aged 18 to 20 as part of broader efforts to combat organized crime.

2.2 Schools, Neighborhoods, and Peer Group Formation

The institutional features of the Swedish compulsory school system and its interaction with residential neighborhoods shape how peer groups form and evolve over time. Because the empirical strategy relies on variation in peer exposure within schools and neighborhoods, this subsection briefly describes how students are assigned to schools and how peer groups change during compulsory schooling.

Children in Sweden attend compulsory school from approximately ages 6 to 16. The system is typically organized into three stages: lower (grades 0–3), middle (grades 4–6), and upper (grades 7–9). Although grade configurations vary somewhat across municipalities, most students transition to a new school before grades 4 or 7. As shown in Appendix Figure A4, school transitions are concentrated between grades 3–4 and 6–7, making these points moments when peer groups are reshuffled.

Since the early 1990s, Sweden has operated a decentralized school system with publicly funded independent schools. All schools follow the national curriculum and administer standardized tests in grades 3, 6, and 9. Independent schools manage their own admissions, typically based on queue time, geographic proximity, or sibling preference. Municipality-run schools assign students based on residential proximity and must accommodate all children living in their catchment areas, including newly arrived refugees (Björklund et al. 2004; Holmlund et al. 2020; Sjögren et al. 2024). Although municipalities attempt to limit school segregation, the combination of residential segregation and expanded school choice has contributed to increased school-level segregation since the 1990s (Böhlmark et al. 2016; Mörtlund 2020).

The analysis focuses on grade 7, the first year of upper compulsory school, when students are typically 13 to 14 years old. This transition frequently coincides with a move to a larger school that combines students from multiple feeder schools, generating substantial reshuffling of peer groups. The timing also aligns with police intelligence reports indicating that the modal age of gang recruitment is between 13 and 15 (Brottsförebyggande rådet 2023). Grade 7 therefore provides a natural setting to observe initial exposure to peers whose relatives are connected to criminal networks. Later grades involve fewer institutional transitions, and peer changes in those years are more likely to reflect endogenous sorting.

3 Data

3.1 Data Sources

The analysis combines several administrative datasets maintained by the Swedish Police, the Swedish National Council for Crime Prevention (Brå), Statistics Sweden, and the National Board of Health and Welfare. Unique personal identification numbers assigned to all Swedish residents allow precise linkage across registers.

Gang and Crime Registers. A central component of the analysis is a police-administered dataset known as the *cylinder model*, introduced in 2019 to map criminal networks. For clarity, I refer to this dataset as the *gang register*. Individuals are included and listed based on local police intelligence, documented criminal history, and encrypted communications indicating active involvement in organized criminal groups (Gerell et al. 2020). Inclusion in the register does not correspond to the exact moment of gang entry; rather, it reflects the point at which law enforcement identified an individual as actively involved in networked criminal activity.

The gang register is available for 2019–2024 and identifies individuals confirmed by police as active participants in criminal networks. To complement this information and capture criminal activity among relatives and peers over a longer horizon, I rely on two additional Brå registers. The *convictions register*, available from 1975 onward, records offenses, sanctions, and both offense and conviction dates, while the *suspects register*, available from 1995 onward, records suspected offenses along with offense and confirmation dates. Both registers include case identifiers that allow the identification of co-offenders.

Convictions often follow an earlier suspicion entry, but this is not always the case. For some offenses no separate suspicion stage is recorded, and the offense appears only in the convictions register. Using both sources therefore provides the most comprehensive record of criminal activity. Throughout the paper I refer to "offenses" without distinguishing between suspicions and convictions and use the offense date to determine the timing of criminal events. Because the age of criminal responsibility in Sweden is 15, offenses committed before that age do not appear in these registers. The main outcomes in the analysis occur after compulsory school, when individuals are typically at least 16 years old.

School and Neighborhood Registers. To measure peer exposure, I use annual administrative registers that link each compulsory school student to a specific school, grade, and residential area. These data are available from 2008 onward. Residential locations are defined using *Regional Statistical Areas* (RegSO), small geographic units designed by Statistics Sweden to study segregation. Sweden contains 3,363 RegSOs, ranging in size from roughly 650 to 23,000 residents. RegSO boundaries are independent of school catchment areas. A single school typically draws students from multiple RegSOs, and students from a given RegSO may attend several different schools. This many-to-many relationship generates variation in peer exposure both within schools and within neighborhoods. Because RegSO boundaries are stable over time, they provide a consistent geographic framework for measuring residential context and local socioeconomic conditions.

Demographic and Socioeconomic Registers. The analysis also uses the Statistics Sweden *multigenerational register*, which links individuals to parents, siblings, aunts, uncles, and cousins. These links allow the construction of extended family networks. I combine these relationships with socioeconomic information on income, education, employment, and

household structure. Additional demographic information includes country of birth and immigration and emigration dates.

Health Registers. Finally, I use health registers from the National Board of Health and Welfare that record diagnoses across the healthcare system, including mental health conditions such as depression and anxiety. These data allow the analysis to track changes in psychological well-being during and after compulsory schooling. Previous research has documented elevated rates of mental health diagnoses among individuals involved in organized crime in Sweden (Rostami et al. 2018), though causal mechanisms remain unclear. The registers also capture mental health outcomes among students who may be exposed to violence or criminal activity in their local environments.

Combining these data sources allows the analysis to follow cohorts of compulsory school students while simultaneously observing their family networks, school environments, and neighborhood contexts. The linked registers provide detailed information on criminal activity, family relationships, and peer exposure, enabling the study of how connections to relatives and classmates involved in criminal networks shape subsequent criminal, educational, and health outcomes.

3.2 Gangs and Gang-Related Offending

This subsection uses the gang register to characterize individuals identified by the police as active participants in criminal networks. The purpose is twofold. First, the descriptive patterns provide a clearer picture of who appears in the gang register and what types of criminal activity characterize this population. Second, these patterns help inform how gang-related behavior can be approximated in earlier years, before the gang register becomes available. Examining the demographic and criminal profiles of confirmed gang members highlights behaviors that are disproportionately common in the gang register and therefore useful for constructing measures of gang-related activity in earlier periods.

Who is in the Gang Register? Table 1 reports descriptive statistics for individuals listed in the gang register. Approximately 94 percent are male, consistent with police reports that gang participation in Sweden is overwhelmingly concentrated among men. A large share of individuals also have a foreign background (79 percent), of whom 41 percent are foreign-born. Their household environments reflect multiple forms of disadvantage. Among individuals with observable childhood records, 64 percent have at some point lived in a single-parent household, and 49 percent have resided in areas classified by the police as "vulnerable," defined by elevated crime levels and weakened social cohesion.

Criminal activity is widespread among individuals in the gang register. Approximately 77 percent have been involved in at least one recorded offense. Offending frequently occurs in groups: 73 percent have participated in an offense with at least one co-offender, 54 percent in an offense with five or more co-offenders, and 38 percent in an offense involving ten or

Table 1: Summary Statistics for Individuals in the Gang Register

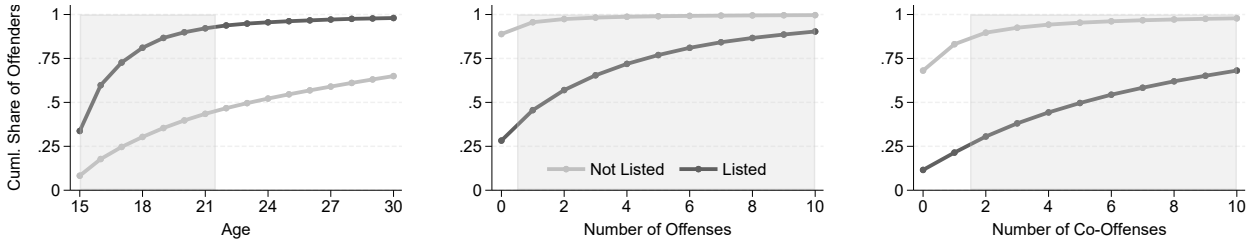
	N	Mean
A. Demographics		
Year of Birth	18490	1998
Male	18490	0.94
Foreign Born	18490	0.41
Foreign Background	18490	0.79
B. Household Characteristics While a Minor (Conditional on Observable Records)		
Lived in a single-parent household (Ever)	15272	0.64
Lived in a vulnerable neighborhood (Ever)	15282	0.49
C. Offending and Co-Offending		
Any offense	18490	0.77
Solo Offense	18490	0.54
1+ Co-Offenders	18490	0.73
5+ Co-Offenders	18490	0.54
10+ Co-Offenders	18490	0.38
D. Family Links to Other Listed Individuals (Conditional on Observable Relatives)		
Fathers	15282	0.03
Older Brothers	10835	0.23
Uncles	5733	0.06
Older Cousins	4309	0.10

Note.—Table reports N and means for demographics, criminal history, and family gang status among individuals in the Gang Register. Observation counts vary across variables due to missing data; for example, 3,208 individuals lack father identifiers, often reflecting migrants who arrived without their fathers. Similar patterns apply to brothers, uncles, and cousins when those relatives do not exist or are not in Sweden.

more co-offenders. 54 percent have committed at least one offense alone. These patterns highlight the strongly collective nature of offending among individuals in the gang register. Among individuals with observable relatives of each type, 3 percent have a parent listed in the gang register, 23 percent have an older sibling, 6 percent have an uncle or aunt, and 10 percent have an older cousin who is also identified as a gang member.

Gang-Related Offending. The descriptive patterns highlight that individuals listed in the gang register are heavily involved in criminal activity and frequently offend together with others. I next use these individuals to identify behavioral patterns that distinguish gang members from other offenders. The goal is to construct a measure of gang-related offending that can be applied to earlier years, before the gang register becomes available.

To do so, I compare the criminal histories of individuals listed in the gang register with those of offenders in the broader population. Although individuals in the gang register account for a relatively small share of all offenders, they are disproportionately involved in serious and high-profile crimes. Appendix Table A1 documents these differences across major crime categories, including narcotics, violent, property, and weapons offenses. These patterns help identify forms of offending that are most closely associated with gang involvement and therefore useful for approximating gang-related activity in earlier periods.



(a) Age at First Offense (b) Gang-Common Offenses (c) Repeated Co-Offending

Figure 2: Comparison of Offenders Listed vs. Not Listed in the Police Gang Register

Note.—The figure reports age of first offense, number of gang-common offenses (murder, weapons possession, aggravated narcotics, robbery, coercion, and extortion), and the number of co-offenses (Assault, Property, and non-aggravated narcotics) separately for individuals listed and not listed in the police gang records. Panel (a) shows the share with a first recorded offense before age 21. Panel (b) reports the number of gang-common offenses. Panel (c) reports the number of co-offenses across non-aggravated narcotics, assault, and property crimes, measured jointly across these categories. The sample covers offenses committed between 2007 and 2023. The year 2007 is the first year in which offenses count toward qualifying relatives, corresponding to the earliest cohort that enters grade 7 in 2013.

Figure 2 illustrates three such patterns. First, gang members tend to begin their criminal careers earlier. Panel A shows that approximately 95 percent of individuals listed in the gang register who have any criminal record committed their first offense before age 21, the age at which individuals historically become fully subject to adult sanctions under Swedish law. Among offenders not listed in the register, fewer than half have a criminal record before this age. Second, gang members are disproportionately involved in a set of serious crimes frequently associated with organized criminal activity. Brottsförebyggande rådet (2023) identifies several offenses that commonly occur in gang environments, including firearms-related crimes and other forms of organized violence. Following this classification, I define *gang-common offenses* as murder, weapons possession, robbery, extortion, coercion, and aggravated narcotics offenses. Panel B shows that roughly three quarters of individuals listed in the gang register have been suspected of at least one gang-common crime. In contrast, approximately 95 percent of individuals not listed in the register have never committed such an offense. Third, gang members are characterized by repeated co-offending. While gang-common crimes are informative indicators of organized criminal activity, they occur relatively infrequently. Many gang participants instead engage repeatedly in less severe offenses such as assault, property crimes, or non-aggravated narcotics offenses. On their own, these crimes are not specific to gang environments: the same legal classifications apply to youth theft or bar fights. However, repeated participation in these offenses together with co-offenders provides a stronger signal of networked criminal activity. Panel C shows that roughly 75 percent of individuals in the gang register repeatedly co-offend in these categories at least twice, whereas only about 20 percent of offenders not listed in the register exhibit similar patterns.

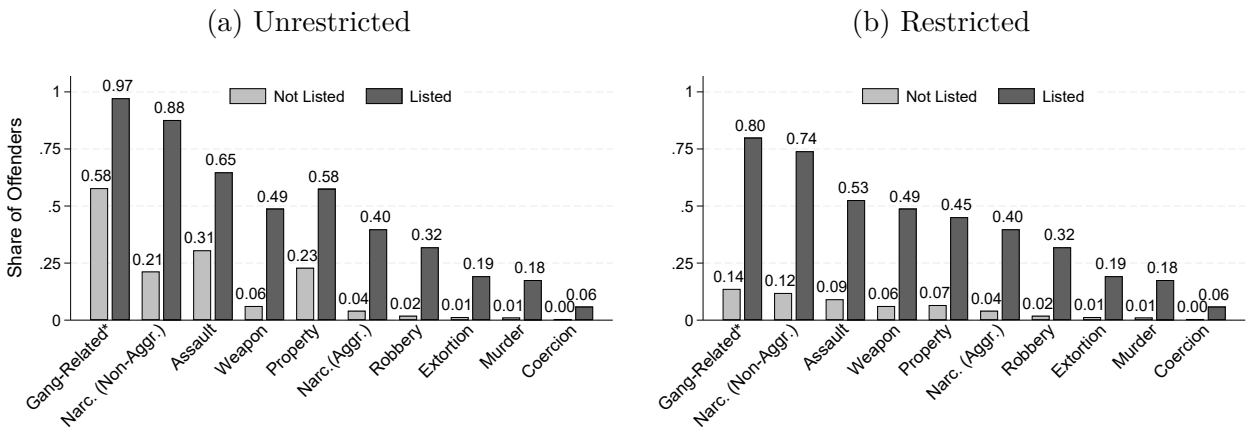


Figure 3: Offense-Type Shares by Gang Register Listing

Note.—Panel (a) reports the share of offenders, listed and not listed in the Gang Register, who have at least one recorded offense in each crime category. Panel (b) reports the same shares under additional restrictions: (i) the offender's first recorded offense occurs by age 21; and (ii) for non-aggravated narcotics, assault, and property crimes, the offender must have co-offended at least three times across these categories. The sample covers offenses committed between 2007 and 2023. The year 2007 is the first year in which offenses count toward qualifying relatives, corresponding to the earliest cohort that enters grade 7 in 2013.

These patterns motivate the construction of a measure of *gang-related offending*. An individual is classified as having committed gang-related crime if they satisfy at least one of two conditions: (i) they have committed a gang-common offense, or (ii) they have repeatedly co-offended in assault, property, or non-aggravated narcotics offenses as described above. In addition, the individual's first recorded offense must occur before age 21.

Figure 3 evaluates how well this definition distinguishes gang members from other offenders. Panel A reports the share of offenders with at least one offense in each crime category without imposing the additional restrictions described above. Under this broad definition, 97 percent of individuals listed in the gang register have at least one gang-related offense, but so do 58 percent of offenders who are not listed in the register. While this measure captures most confirmed gang members, it also identifies many individuals whose criminal activity likely reflects other forms of offending. Panel B applies the additional restrictions based on the timing of the first offense and repeated co-offending. Under this refined definition, the share of individuals in the gang register classified as gang-related remains high at 80 percent, while the corresponding share among individuals not listed in the register falls to 14 percent. The refined definition therefore retains a large share of confirmed gang members while substantially reducing the number of offenders classified as gang-related outside the register.

The remaining offenders classified as gang-related but not listed in the gang register may arise for several reasons. Some individuals may be connected to criminal networks but have not yet been identified by the police as belonging to a gang environment. Others may have been involved in gang activity before the introduction of the gang register in 2019 but no

longer exhibit such behavior. The crime data used here cover offenses committed between 2007 and 2023, which includes periods both before and after the register was introduced. Finally, some offenders may display patterns of behavior that resemble gang-related activity without being directly connected to an organized criminal network.

In the analysis that follows, this measure of gang-related offending is used to identify relatives and peers whose criminal behavior indicates likely exposure to gang environments prior to the introduction of the gang register.

3.3 Construction of the Main Analysis Sample

The analysis focuses on students observed in grade 7 between 2013 and 2019. As discussed in the institutional background, grade 7 is the first year of upper compulsory school and typically coincides with a transition to a new school that reshuffles peer groups. This stage also aligns with the age at which gang recruitment is most frequently reported to begin, typically between ages 13 and 15 (Brottsförebyggande rådet 2023). Observing students at the start of grade 7 therefore provides a natural window to study peer environments at the point when new school-based peer groups form and students from different residential neighborhoods are brought together. Focusing on this entry point also limits concerns about endogenous peer sorting or selective attrition within schools.

The sample is constructed as follows. (i) I begin with the full register of compulsory school students and identify each student's parents, siblings, and extended relatives using the multigenerational register. Students are restricted to those who remain alive and resident in Sweden throughout grades 7 to 9. (ii) I merge socioeconomic, demographic, and crime records for each family member and for the focal student. These data include indicators for sex, foreign background, household structure, and parental characteristics such as income, employment status, education, and age. (iii) I link criminal records to relatives and restrict offenses to those committed between the year the focal student turns six (the start of compulsory schooling) and the year prior to entry into grade 7. This window captures family criminal activity during the period when the student is growing up while avoiding overlap with the school year in which peer exposure is measured. (iv) I measure outcomes for the focal student after compulsory school. Criminal offenses are tracked from age 16 to age 21, beginning when students typically complete compulsory schooling and ending at the age when full sentencing rules historically applied under Swedish law.[7] I also track mental health diagnoses (e.g., depression and anxiety) during and after compulsory school, along with educational outcomes including standardized test scores in grades 6 and 9, the merit score,[8] and eligibility for upper secondary school, defined as passing grades in Swedish,

[7] In January 2022, a reform lowered the age threshold for full sanctioning from 21 to 18, such that individuals aged 18–21 now serve their sentences in full. This change was part of a broader legislative response to rising gang crime.

[8] Grades in each subject at the end of grade 9 are converted into point values and summed into a total merit score, which forms the basis for applications to upper-secondary school.

mathematics, and English. (v) Finally, I merge these variables back into the student register and retain observations for students enrolled in grade 7 between 2013 and 2019. Students are required to be between ages 12 and 14 at the start of the academic year to accommodate both early starters and grade repeaters.

The resulting dataset consists of repeated cross-sections of grade 7 students covering birth cohorts from 2000 to 2006. In total, the data contain 609,459 students across 2,158 schools, 3,361 neighborhoods (RegSO), and 22,251 unique school-neighborhood cells.

While the dataset includes both male and female students, the main analysis focuses on male students. This restriction reflects the composition of the gang register, where approximately 94 percent of identified individuals are male. The estimation sample therefore consists of a subsample of boys drawn from the full set of students described above.

3.4 Gateway Exposure

Building on the measure of gang-related offending introduced above, I construct a measure of exposure to *gateway peers* (GW peers). GW peers are students whose older relatives exhibit offending behavior consistent with gang-related offending and who may link family-based criminal networks to students' peer environments.

Measure. A student is classified as a GW peer if an older family member has a documented history of offending consistent with gang-related activity. These histories are constructed using the suspect and conviction registers described in the data section. I track each type of relative separately and distinguish between fathers, mothers, older brothers, older sisters, uncles, aunts, male cousins, and female cousins. Let f index the source of exposure corresponding to these relative types. In line with the focus on male focal students, the analysis primarily emphasizes exposure generated by male relatives.[9]

Once the gateway indicator is defined for each peer j in peer group p in year t, denoted D^f_{jpt}, the focal student's exposure is calculated as a leave-out mean for each family source type f:

$$\text{GW Exposure}^f_{ipt} = \frac{\sum_{j \neq i} D^f_{jpt}}{N_{pt} - 1}, \tag{1}$$

where N_{pt} denotes the number of students in peer group p in year t, and $D^f_{jpt} = 1$ if peer j is a GW peer whose older relative of type f has a history of offending consistent with gang-related activity. Peer groups p are defined at the school-grade, neighborhood-grade, or school-neighborhood-grade level. The resulting measures therefore capture exposure within both school and residential peer environments. Exposure is calculated using all students in the relevant peer group, regardless of gender. GW peers may therefore be either male

[9]Female relatives are incorporated in extension analyses.

or female students connected to relatives who exhibit gang-related offending patterns. The relevant source of exposure is the older relative involved in such offending rather than the gender of the intermediary student.[10]

The resulting measures capture the fraction of peers whose family networks connect them to environments characterized by gang-related offending through a specific type of older relative. Higher values of $GWExposure^{f}_{ipt}$ therefore indicate that a larger share of school or neighborhood peers serve as gateways linking students to such networks through that family source.

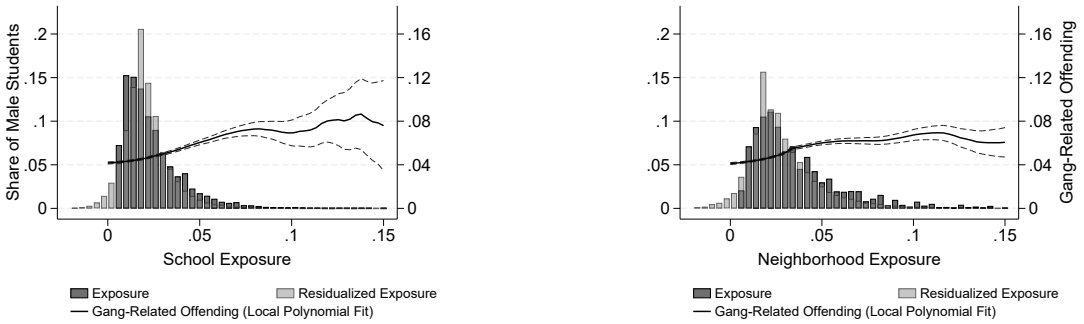
Variation. Appendix Figure A5 documents variation in GW exposure along the extensive margin and by the type of relative underlying the measure. Panel (a) reports the extensive margin in school cohorts. Approximately 57 percent of school cohorts contain at least one peer whose father has prior gang-related offending. This share increases to about 73 percent when exposure is defined through older brothers, and to 87 and 91 percent when it is defined through uncles or older cousins. These patterns show that exposure to GW peers is widespread. At the same time, closer family ties—in particular fathers and older brothers—activate the GW indicator for a smaller set of individuals than extended-family ties. This difference is reflected in the prevalence of exposure across cohorts and suggests that uncle- and cousin-based measures may contain a weaker signal, as the relevance of these relatives is likely to vary more across individuals.

Panel (b) presents the corresponding evidence for neighborhood cohorts. The qualitative pattern across relative types is similar, but exposure rates are uniformly lower. Around 37 percent of neighborhood cohorts are exposed to father-based GW peers, and about 50 percent to brother-based GW peers. Exposure through uncles and cousins ranges from roughly 72 to 78 percent. This level difference is consistent with neighborhoods being more homogeneous, with GW peers more concentrated in disadvantaged areas, whereas schools bring together students from multiple neighborhoods and therefore increase the likelihood of exposure within a given cohort.

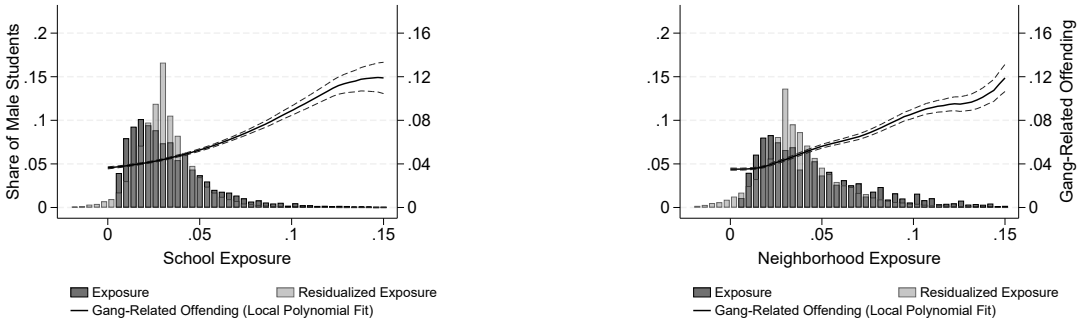
Figure 4 reports the intensive variation in GW exposure by relative type. For each relative type, the figure presents three objects separately for school-grade and neighborhood-grade cohorts: (i) the raw distribution of exposure, (ii) the residualized distribution after absorbing neighborhood-school and calendar-year fixed effects, and (iii) a local polynomial fit of the raw relationship between exposure and the focal student's own gang-related offending between ages 16 and 21. These fixed effects are discussed in Section 5.

Panel (a) reports the exposure to father-based GW peers. Exposure defined by fathers is relatively uncommon, but the local polynomial fits suggest a positive raw relationship between exposure and subsequent gang-related offending in both school and neighborhood settings.

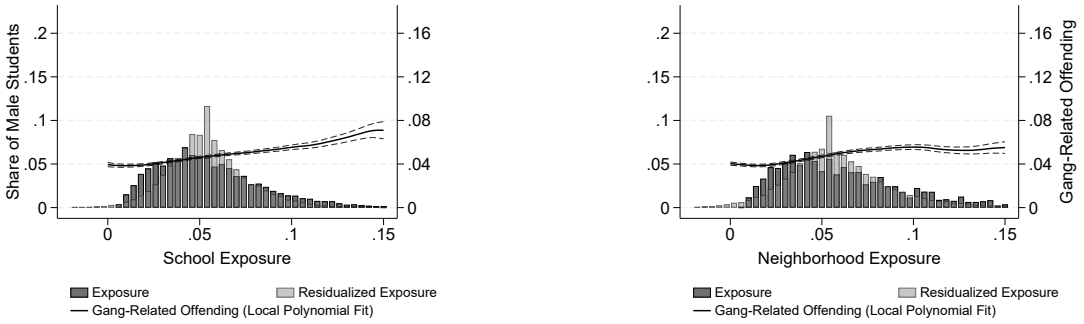
[10]For example, an older brother involved in gang-related activity may affect boys in the same school environment through his younger sister, who serves as the GW peer.



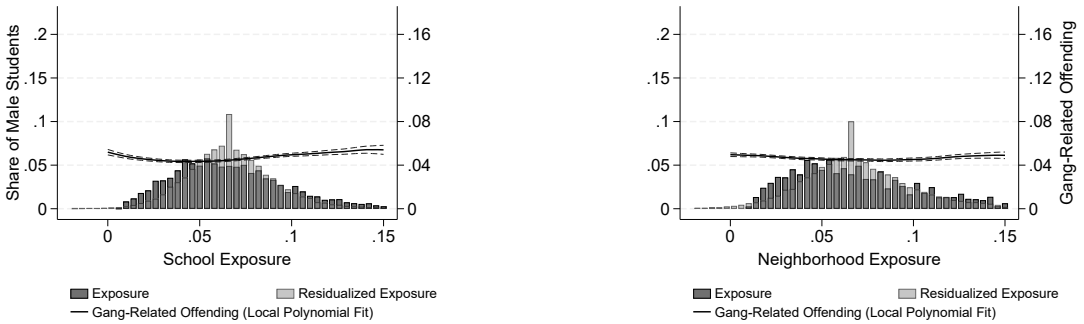
(a) Father-Based GW Exposure



(b) Brother-Based GW Exposure



(c) Uncle-Based GW Exposure



(d) Cousin-Based GW Exposure

Figure 4: Intensive Variation in GW Exposure by Relative Type

Note.—The figure plots the empirical distributions of GW exposure (raw and residualized) separately for exposure defined through fathers, brothers, uncles, and cousins, and separately for school-grade and neighborhood-grade cohorts. GW exposure is measured as the share of peers in the relevant cohort with the corresponding relative type exhibiting prior gang-related offending. The residualized distributions are obtained after absorbing neighborhood-school and calendar-year fixed effects. The figure also reports local polynomial fits of the relationship between exposure and the focal student's own gang-related offending between ages 16 and 21. The local polynomial uses a triangular kernel, with bandwidth chosen using a rule-of-thumb plug-in approximation to the asymptotically optimal bandwidth, and a local constant (degree 0) specification. Observations with zero exposure are excluded, and the distribution is truncated at 0.15.

The relationship becomes imprecise at higher exposure levels, reflecting the limited mass in the right tail of the distribution. Panel (b) shows the same objects for brother-based GW exposure. Most of the mass of school-level exposure lies between 0 and 5 percent, with a right tail extending to around 10 percent. In the average school cohort, this corresponds to roughly 1 to 10 GW peers. The neighborhood-level distribution is flatter, with a thicker right tail. Given smaller cohort sizes, the same exposure range corresponds to approximately 1 to 5 GW peers. As with father-based exposure, the local polynomial fits indicate a clear positive raw relationship between exposure intensity and subsequent gang-related offending in both school and neighborhood contexts. Panels (c) and (d) report the corresponding evidence for uncle- and cousin-based GW exposure. While these sources of exposure are more common, the raw relationships are less clearly positive than for father- and brother-based exposure. This suggests that, although exposure through extended family is widespread, it may carry a weaker signal and be less informative for identifying the types of GW peers that matter for later outcomes.

After absorbing neighborhood-school and calendar-year fixed effects, substantial variation remains across all relative types, although the distributions become more concentrated around the mean and the right tails are attenuated. The remaining variation captures the within-environment differences in exposure that the empirical design later draws on. Appendix Table A2 reports the raw and residualized variation in tabular form.

4 Preliminary Descriptive Analysis

4.1 Students Summary Statistics

Table 2 reports means for four samples of male students: (1) all male students, (2) male students without any relative with prior gang-related offending, (3) male students with at least one relative with prior gang-related offending (the GW peers), and (4) male students with at least one relative listed in the gang register. The corresponding summary statistics for female students are reported in Table A3, and summary statistics for GW peers themselves, by relative type, are reported in Table A4. Column (2) serves as the main reference group in the analysis. Column (4) is included to illustrate the characteristics of students with relatives who appear in the gang register. Because these relatives are observed in the register only after the relevant analysis period, this information is not directly used to determine GW peers. Nevertheless, the comparison is informative for understanding the broader set of students connected to gang-affiliated relatives.

Comparisons across columns show large differences in both offending and school outcomes. Among all male students, 19 percent are suspected or convicted of at least one offense between ages 16 and 21. The share is 17 percent in column (2), 29 percent in column (3), and 46 percent for males in column (4).

Table 2: Summary Statistics for Male Students in Grade 7

	(1) All Students	(2) Non-GW Students	(3) GW Students	(4) Gang Students
A. Outcomes: Post or End of Compulsory School				
Crime Activity (Age 16-21)				
Any	0.19	0.17	0.29	0.46
Gang-Related	0.06	0.05	0.11	0.24
Violent	0.06	0.05	0.10	0.24
Property	0.07	0.06	0.12	0.23
Narcotics	0.08	0.07	0.14	0.30
Weapon	0.02	0.02	0.04	0.11
Other	0.07	0.07	0.10	0.15
Listed in the Gang Register	0.02	0.01	0.03	0.21
Eligibility for Upper Secondary School	0.88	0.89	0.81	0.70
Merit Score	212.66	217.42	187.28	166.87
Standardized Test (Grade 9)	-0.06	-0.02	-0.32	-0.62
Mental Health Diagnoses (Age 16-21)				
Mood	0.03	0.03	0.04	0.02
Stress	0.05	0.04	0.07	0.05
B. Background				
Foreign Background	0.20	0.21	0.14	0.51
Single Parent Home	0.25	0.23	0.35	0.37
Standardized Test (Grade 6)	-0.08	-0.04	-0.30	-0.60
Father Characteristics				
Age	46.32	46.37	46.04	45.81
Above Median Labor Income	0.51	0.54	0.38	0.26
Employed, yr t-1	0.87	0.88	0.81	0.67
Yrs. of Schooling	12.21	12.39	11.25	10.40
Dead	0.01	0.01	0.02	0.02
Missing	0.03	0.03	0.01	0.03
Mother Characteristics				
Age	43.30	43.39	42.85	41.72
Above Median Labor Income	0.50	0.52	0.42	0.27
Employed, yr t-1	0.84	0.84	0.80	0.64
Yrs. of Schooling	12.82	12.96	12.06	10.68
Dead	0.00	0.00	0.01	0.01
Missing	0.00	0.01	0.00	0.01
C. Peer Groups				
Peers in school-grade	95.11	95.63	92.34	89.94
Peers in neighborhood-grade	49.38	49.68	47.79	51.50
Peers in neighborhood-school-grade	22.83	23.00	21.90	21.06
Observations	347,044	292,144	54,900	6,408

Note.—The table reports sample means for four groups of male students in grade 7: (1) all male students, (2) male students without any relative with prior gang-related offending, (3) male students with at least one relative with prior gang-related offending (the GW peers), and (4) male students with at least one relative listed in the gang register. Crime activity and mental health diagnoses are measured between ages 16 and 21, while school outcomes are measured at the end of compulsory school. Relatives listed in the gang register are recorded after the analysis windows. The corresponding summary statistics for girls are reported in Table A3.

Gang-related offending rises from 5 percent in column (2) to 11 percent in column (3) and 24 percent in column (4). Violent, property, narcotics, and weapons-related offenses follow the same pattern. Educational outcomes deteriorate sharply across the same columns. High school eligibility falls from 89 percent in column (2) to 81 percent in column (3) and 70 percent in column (4). Merit scores, similar to GPA, decline from 217 to 187 and 167, while grade 9 standardized test scores fall from -0.02 to -0.32 and -0.62. The same gradient appears in later gang-register listing: 1 percent of boys in column (2) are listed in the register, compared with 3 percent in column (3) and 21 percent in column (4).

Background characteristics also differ substantially. Students with at least one relative with prior gang-related offending are more likely to grow up in a single-parent household and have markedly lower grade 6 test scores than boys in column (2). Their parents have lower labor income, lower employment rates, and fewer years of schooling. These disadvantages are even more pronounced in column (4). One exception concerns foreign background, which is less common in column (3) than in column (2). This pattern is driven by the definition of exposure in column (3), which conditions on gang-related offending among a broader set of relatives, including parents, uncles, and aunts. Such relatives are more likely to be observed with gang-related offending in the native population than in the foreign-background population in the data. When exposure is defined only through gang-related older brothers, the share with foreign background is higher, around 31 percent. Mental health differences are more limited. Mood diagnoses are similar across columns, while stress diagnoses increase from 4 percent in column (2) to 7 percent in column (3) and are 5 percent in column (4).

Peer group sizes are broadly similar across samples. Students in columns (3) and (4) attend slightly smaller school-grade cohorts and have somewhat fewer peers who overlap in both school and neighborhood, but these differences are modest relative to the large gaps in offending, academic performance, and family background.

4.2 Family Exposure to Gang-Related Offending

I begin by characterizing family exposure to gang-related offending. For each focal student, I measure whether a father, brother, uncle, or cousin has prior gang-related offending. This exercise serves two purposes. First, it documents how gang-related exposure is distributed across different kinship ties and which relatives are most strongly associated with the student's own outcomes. Second, it provides an informal first stage for the later analysis of school and neighborhood peer effects by summarizing the family environment students bring with them into those settings and identifying which family links are most predictive of subsequent gang involvement. More broadly, this exercise relates to the literature on the intergenerational transmission of criminal or "anti"-human capital, which has largely focused on parents and siblings (Besemer and Farrington 2012; Finlay et al. 2023; Hjalmarsson and

Lindquist 2012; Junger et al. 2013). Here I extend that approach by considering exposure through more distant relatives in the extended family.

To examine how gang-related histories within the family relate to the focal student's later outcomes, I estimate a version of the extended-family model in Adermon et al. (2021):

$$y_i = b_0 + \sum_k b_k c_{ik} + e_i \tag{2}$$

where y_i is either an indicator for gang-related offending between ages 16 and 21 or an indicator for ever being listed in the Gang Register. The variable c_{ik} equals one if student i has at least one relative of type k with prior gang-related offending and zero otherwise, where $k \in \{\text{father, brother, uncle, cousin}\}$.

Table 3 reports estimates from sequential versions of (2). Columns (1)–(4) use the student's own gang-related offending between ages 16 and 21 as the outcome, while columns (5)–(8) use an indicator for whether the student is ever listed in the Gang Register. Within each outcome, the specifications add family links sequentially, beginning with father only and then adding brother, uncle, and cousin. Relatives' gang-related offending is measured prior to the focal student's entry into grade 7.

The associations are large and decline with kin distance, though the ranking differs somewhat across outcomes. For gang-related offending, the largest coefficient in the fully saturated specification is for fathers. Having a father with prior gang-related offending is associated with a 15.2 percentage point increase in the probability that the focal student later commits a gang-related offense. The corresponding coefficients are 10.7 percentage points for brothers, 5.7 points for uncles, and 2.6 points for cousins. For the more restrictive outcome of appearing in the Gang Register, however, brothers have the largest coefficient. In the fully saturated specification, having a brother with prior gang-related offending is associated with a 5.4 percentage point increase in the probability of Gang Register listing, compared with 3.6 points for fathers, 2.3 points for uncles, and 0.6 points for cousins. This suggests that sibling exposure is particularly closely linked to the types of organized or persistent gang involvement captured by the register.

These estimates also help interpret the descriptive patterns in Figure 4. The raw relationship between GW exposure and other students' later gang-related offending is more clearly positive when GW peers are defined through fathers or brothers than when they are defined through uncles or cousins. The results here suggest one reason why: immediate family ties are much more strongly related to the GW peer's own later offending. In that sense, father- and brother-based GW measures appear to identify gateway peers with a stronger underlying link to gang-related behavior, whereas uncle- and cousin-based measures likely contain more noise and therefore provide a weaker signal of exposure relevant for others.

To summarize the joint contribution of family exposure, I also report a Lubotsky–Wittenberg index that combines the relative indicators into a single proxy for the under-

Table 3: Family Correlations

Dep. Variables:	Gang-Related Offense (Ages 16–21)				Listed in the Gang Register			
	(1) Father	(2) +Brother	(3) +Uncle	(4) +Cousin	(5) Father	(6) +Brother	(7) +Uncle	(8) +Cousin
Relative has Prior Gang-Related Offending (0/1)								
Father	0.174**	0.164**	0.154**	0.152**	0.043**	0.039**	0.037**	0.036**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.003)	(0.003)	(0.003)	(0.003)
Brother		0.116**	0.109**	0.107**		0.059**	0.055**	0.054**
		(0.004)	(0.004)	(0.004)		(0.003)	(0.003)	(0.003)
Uncle			0.060**	0.057**			0.024**	0.023**
			(0.002)	(0.002)			(0.001)	(0.001)
Cousin				0.026**				0.006**
				(0.002)				(0.001)
Sum of *b_k*	0.174	0.259	0.253	0.267	0.043	0.089	0.097	0.101
	0.006	0.006	0.006	0.006	0.003	0.004	0.004	0.004
Observations	347,044	347,044	347,044	347,044	347,044	347,044	347,044	347,044
Dep. mean	0.056	0.056	0.056	0.056	0.016	0.016	0.016	0.016

Note.—The table reports raw correlations between indicators of the involvement of fathers, brothers, uncles, and cousins in gang-related offenses prior to the entry of the focal student into grade 7 and the student's own gang-related offending between the ages 16 and 21. Estimates are based on variants of equation (2). Columns (1) and (5) present baseline regressions including only an indicator for fathers; subsequent columns sequentially add indicators for brothers, uncles, and cousins. As each relative type is introduced, the specification also includes a dummy indicating whether that relative type is missing for the focal student. The *Sum of* b_k is constructed following the Lubotsky-Wittenberg method for proxy variables and gives a lower-bound of a "crime-family" effect (Lubotsky and Wittenberg 2006). Robust standard errors are reported in parentheses; standard errors for the *Sum of* b_k are bootstrapped with 1,000 replications.
$(^{**})$ $p < .01$, $(^{*})$ $p < .05$, $(^{+})$ $p < .1$.

lying family environment (Lubotsky and Wittenberg 2006). Adding brother exposure to the father-only specification produces the largest increase in this index for both outcomes, while uncle and cousin exposure add more modestly. Most of the predictive content in family gang-related exposure therefore comes from immediate family ties.

These results show that gang-related offending is strongly concentrated within families, especially through immediate family links. Students with relatives involved in gang-related offending — the GW peers — therefore enter school and neighborhood environments with markedly different family backgrounds and network connections. The question that follows is whether this exposure extends beyond the family. In particular, do GW peers influence the behavior of their school and neighborhood peers, either through their own behavioral responses or through links to the networks associated with their relatives? And does the answer depend on which relative defines the GW peer?

5 Empirical Design

This section outlines the cohort-to-cohort design, discusses key identification assumptions, and addresses potential threats to identification. The section concludes with a set of tests that assess the plausibility of these assumptions.

5.1 Cohort-to-Cohort Design

Setup. The empirical analysis examines how exposure to GW peers during grade 7 affects subsequent outcomes for focal students. GW peers are defined as students whose older relatives exhibit offending behavior consistent with gang-related activity and who therefore connect family-based criminal networks to the peer environments in which students interact.

The primary outcome of interest is the focal student's own involvement in gang-related offending and, ultimately, whether the student is listed in the gang register. The analysis also considers a set of secondary outcomes, including broader criminal behavior, educational performance, and mental health. A simple comparison relates student outcomes to the share of GW peers in their peer environment. Such comparisons, however, do not yield a causal interpretation because exposure to GW peers may be correlated with unobserved characteristics of schools, neighborhoods, or families that also influence later outcomes.

Identification. Three challenges complicate the identification of spillover effects in schools and neighborhoods: selection, reflection, and common shocks.

As mentioned above, selection poses an immediate concern. Families may sort into schools or neighborhoods based on socioeconomic characteristics correlated with peer composition (Holmlund et al. 2020). The empirical strategy addresses this concern by leveraging cohort-to-cohort variation in peer composition within schools and neighborhoods.

Reflection (Manski 1993; Moffitt 2001) arises when the behavior of a focal student and their peers mutually influence each other, complicating causal interpretation. In this setting, treatment is defined by the historical offending behavior of the older relatives of peers. The direction of influence is therefore assumed to run from the older relative (the source), to the gateway (GW) peer, and subsequently or directly to the focal student through shared peer environments. Because the offending used to define GW peers predates grade 7, it is unlikely that the focal student could influence a peer's older relative, limiting concerns related to the reflection problem. This age-based direction of influence is consistent with evidence showing that criminal or disruptive influences tend to flow from older to younger individuals (Altonji et al. 2017; Eriksson et al. 2016).

Common shocks may simultaneously affect the composition of peer groups and future criminal outcomes, potentially confounding the estimated effects of exposure. To address this concern, I include calendar-year fixed effects to absorb nationwide shocks affecting entire grade cohorts. Localized shocks that vary over time within schools or neighborhoods — such

as changes in teaching staff, temporary school programs, or targeted policing initiatives — remain a potential concern. I therefore explicitly assess the plausibility of quasi-random cohort-to-cohort variation in Section 5.2.

Main Regression Model. To implement the cohort-to-cohort identification strategy described above, I estimate the following specification:

$$Y_{i,s,n,t+k} = \beta \cdot \text{GW Exposure}^{f}_{i,s,n,t} + \phi_t + \lambda_{s,n} + \varepsilon_{i,s,n,t} \tag{3}$$

where $Y_{i,s,n,t+k}$ denotes the outcome for student i measured between ages 16 and 21, that is, k years after the student attends grade 7 in year t, at school s and residing in neighborhood n. The primary outcomes capture the focal student's own gang-related offending and whether the student is later listed in the gang register. Secondary outcomes include broader criminal behavior, educational performance, and mental health. The variable $\text{GW Exposure}^{f}_{i,s,n,t}$ captures the share of GW peers in the focal student's peer group whose older relative of type f exhibits offending consistent with gang-related activity.

Peer groups are defined either at the school-grade level (students attending the same school and grade) or at the neighborhood-grade level (students living in the same neighborhood and enrolled in grade 7, possibly across different schools). The specification includes calendar-year fixed effects (ϕ_t) to absorb national cohort shocks and school-neighborhood fixed effects ($\lambda_{s,n}$), which implement the cohort-to-cohort design by comparing adjacent grade cohorts within the same school-neighborhood cells. Standard errors are two-way clustered at the school and neighborhood level.

Following Angrist (2014) and related applied studies (Billings and Hoekstra 2023; Kim and Fletcher 2017; Larsen and Kristensen 2017), I exclude students who themselves qualify as GW peers to avoid mechanically linking a student's own characteristics to the treatment variable. The analysis therefore focuses on students without relatives classified as exhibiting gang-related offending, ensuring that exposure reflects variation in peer composition rather than individual status and that the estimation sample remains consistent across exposure definitions.

I also estimate versions of equation (3) that include controls for focal student characteristics (e.g., foreign background, parental income, education, and employment) and peer group composition (e.g., the share of peers with foreign background). These controls improve precision and serve as robustness checks. In extended specifications, I include multiple exposure measures simultaneously, distinguishing exposure by relative type f, by peer environment (school versus neighborhood), and by sibling characteristics such as age proximity and residence location.

5.2 Assessing Identifying Assumptions

The identification strategy described in Section 5.1 relies on the assumption that cohort-to-cohort variation in GW exposure within school-neighborhood cells is plausibly exogenous. While this assumption cannot be verified directly, its implications can be evaluated using observable characteristics and tests of within-cell variation. The exercises below examine whether GW exposure behaves as expected under the identification assumptions discussed above. Throughout this section, I focus on exposure generated by older brothers, which constitutes the primary treatment used in the analysis.

Selection and Conditional Independence. A key concern discussed above is selection. If families sort into schools or neighborhoods based on characteristics correlated with peer composition, GW exposure may reflect systematic differences in student backgrounds rather than quasi-random cohort variation. Conditional on school-neighborhood fixed effects, the cohort-to-cohort design implies that exposure should not be systematically related to observable characteristics of focal students.

To assess this implication, I examine whether GW exposure is correlated with observable student and family characteristics once comparisons are restricted to students within the same school-neighborhood cells. If the identifying assumption holds, I would expect these correlations to largely attenuate after conditioning on the fixed effects that implement the cohort-to-cohort design. Table 4 presents regressions of GW exposure, defined by peers whose older brothers have prior gang-related offending, on a set of student and family characteristics. Columns (1) and (3) report unconditional correlations. These estimates show that traits such as foreign background, living in a single-parent household, and parental education or employment are significantly associated with exposure, which is consistent with socioeconomic sorting across schools and neighborhoods. Columns (2) and (4) introduce calendar-year fixed effects and restrict comparisons to students within the same school-neighborhood cell. Under these restrictions, the associations largely disappear: coefficients become small in magnitude and statistically insignificant both individually and jointly. This pattern supports the assumption that GW exposure varies across cohorts within the same school-neighborhood environment without being systematically linked to observable student characteristics.

Additional tests reported in Table A5, Table A6, and Table A7 repeat this exercise using GW exposure defined by fathers, uncles, and cousins with prior gang-related offending. The results follow the same pattern, providing further evidence consistent with conditional independence.

Table 4: Exogeneity Test: GW Exposure Defined By Brothers

Peer Environment:	*Dep Var: GW Exposure Defined By Brother Gang-Related Offending*			
	School-Grade		Neighborhood-Grade	
	(1)	(2)	(3)	(4)
Foreign Background	0.0109**	0.0001	0.0172**	-0.0001
	(0.0010)	(0.0001)	(0.0012)	(0.0002)
Single Parent HH.	0.0016**	-0.0001	0.0036**	0.0000
	(0.0002)	(0.0001)	(0.0003)	(0.0001)
Father Age	0.0000	0.0000	0.0000*	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Father Inc. (Below Median)	0.0026**	-0.0000	0.0036**	-0.0000
	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Father Employed	-0.0003	0.0000	-0.0010*	-0.0000
	(0.0003)	(0.0001)	(0.0004)	(0.0002)
Father Comp. School	0.0031**	0.0002+	0.0040**	0.0000
	(0.0003)	(0.0001)	(0.0004)	(0.0002)
Father High School	0.0018**	0.0000	0.0025**	0.0002+
	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Father Missing	0.0015+	0.0001	0.0023*	0.0002
	(0.0009)	(0.0005)	(0.0011)	(0.0007)
Mother Age	-0.0001**	0.0000	-0.0001**	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Mother Inc. (Below Median)	0.0018**	-0.0000	0.0023**	-0.0002
	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Mother Employed	-0.0014**	-0.0000	-0.0025**	-0.0002
	(0.0003)	(0.0001)	(0.0004)	(0.0002)
Mother Comp. School	0.0043**	0.0002	0.0055**	0.0001
	(0.0006)	(0.0002)	(0.0006)	(0.0002)
Mother High School	0.0019**	0.0001	0.0025**	0.0002
	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Mother Missing	0.0021	0.0002	-0.0014	0.0003
	(0.0014)	(0.0008)	(0.0016)	(0.0010)
Year Fixed		✓		✓
School-Neighborhood Fixed		✓		✓
F-Stat	26.3097	0.7432	42.5701	1.0991
p(F)	0.0000	0.7417	0.0000	0.3514
Adj. R^2	0.0653	0.5231	0.0826	0.4572
Dependent Mean	0.0284	0.0284	0.0281	0.0281
Observations	292,144	292,144	292,144	292,144

Note.—Each column reports a separate regression of GW exposure on the listed student and family characteristics. GW exposure is defined using older brothers with prior gang-related offending. Columns (1) and (3) report unconditional correlations, while columns (2) and (4) include calendar-year fixed effects and restrict comparisons to students within the same school-neighborhood cells. Columns (1) and (2) measure exposure at the school-grade level, and columns (3) and (4) at the neighborhood-grade level. The reported F-statistic corresponds to the joint test of the included characteristics, including an indicator for missing household information that is not reported, with p(F) denoting the associated p-value. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

Common Shocks and Random Cohort Formation. Another concern is that variation in peer composition may reflect cohort-specific shocks that affect both exposure and later outcomes. Even within a fixed school-neighborhood environment, differences across cohorts could arise from systematic changes in local conditions rather than idiosyncratic variation in cohort composition.

To assess the presence of such potential shocks, I implement a cohort-shuffling exercise following Billings and Hoekstra (2023) and Carrell and West (2010), with related approaches discussed in Ammermueller and Pischke (2009). The idea is to compare the observed distribution of GW exposure to a benchmark that isolates variation arising from random cohort formation within a given environment. The procedure proceeds as follows. (i) For each observed cohort, I randomly draw 1,000 alternative cohorts of the same size from the pool of all students who ever attended the same school or resided in the same neighborhood in grade 7. (ii) For each simulated cohort, I compute the share of GW peers. (iii) I then calculate an empirical p-value equal to the fraction of simulated cohorts whose GW peer share is lower than that of the actual cohort. By construction, these simulated cohorts preserve the overall composition of each school or neighborhood while eliminating cohort-specific shocks. Under random cohort formation, the rank of the observed cohort within the distribution of simulated cohorts is uniformly distributed, so the distribution of these empirical p-values should be approximately uniform. If cohort-specific shocks are present, the distribution would instead exhibit systematic deviations from uniformity, reflecting that some cohorts are systematically more or less exposed than would be expected under random assignment.

I assess this implication using Kolmogorov-Smirnov and χ^2 tests of uniformity. At the 5% significance level, rejection rates are low. Among 1,754 schools[11], uniformity is rejected in 4 cases using the Kolmogorov-Smirnov test and in 111 cases using the χ^2 test, depending on the characteristic examined. Among 3,062 neighborhoods, the corresponding counts range from 6 for the Kolmogorov-Smirnov test and from 221 for the χ^2 test. Given the large number of tests conducted, some rejections are expected by chance. Overall, these results provide little evidence that the distribution of GW exposure deviates from what would arise under random cohort formation, suggesting that localized shocks are unlikely to drive systematic differences in exposure across cohorts.

Selection Through Endogenous Mobility. A final concern relates to endogenous mobility. If families respond to peer composition by relocating across schools or neighborhoods, estimates of peer effects may be biased. For example, students who are most adversely affected by exposure may be more likely to leave high-exposure cohorts, which would attenuate estimated effects, while students already at higher risk of criminal behavior may be more

[11]The number of tested units is smaller than the 2,158 schools and 3,363 RegSOs in the data because these tests are only informative when there is sufficient student mass distributed across cohorts within a given school or neighborhood. Units with too few students for the within-unit cohort distribution to be estimated are therefore excluded.

likely to remain in such environments, which could inflate estimated effects. Evidence from related contexts suggests that such responses are possible. Sjögren et al. (2024) show that exposure to immigrant peers can induce some students to switch schools. In the present setting, a similar mechanism could arise if students from certain socioeconomic backgrounds relocate in response to GW peer exposure.

To assess this possibility, I examine whether exposure to GW peers in grade 6 predicts mobility into different schools or neighborhoods in grade 7. If endogenous sorting is present, prior exposure should systematically predict subsequent moves. Appendix Table A8 presents regressions of grade 6 GW exposure on school and neighborhood mobility in grade 7. I find no evidence that exposure predicts school switching, either for the full sample or when restricting attention to students who had the option to remain at their current school. Similarly, I find no evidence that exposure predicts residential mobility across neighborhoods. These results hold whether GW exposure is defined using gang-related offending or broader measures of criminal history.

These results are consistent with the identifying assumptions underlying the empirical strategy and suggest that cohort-to-cohort variation in GW exposure within school-neighborhood cells is unlikely to be driven by systematic sorting.

6 Gateway Exposure and Gang-Related Outcomes

This section examines whether exposure to GW peers affects subsequent gang-related outcomes. The analysis proceeds in several steps. I first present reduced-form estimates of exposure to GW peers defined by different family links. I then focus on brother-based GW exposure, which emerges as the primary source of peer spillovers. Subsequent sections examine the robustness of these results and explore potential mechanisms.

Each measure is defined as the share of peers with the corresponding family link and ranges between zero and one. Because moving from zero to full exposure represents an extreme shift with little empirical support, I interpret the estimates in terms of smaller changes. Throughout the paper, I scale the coefficients to a 5-percentage-point (pp.) increase in exposure. In the average peer group, this corresponds to roughly five additional peers in the school-grade setting and about two to three additional peers in the neighborhood-grade setting. This scaling follows, for example, Billings and Hoekstra (2023) and facilitates comparison with related studies.

6.1 Main Results

I begin by examining which family links generate gateway exposure and how these different sources relate to subsequent gang-related outcomes. The analysis then focuses on exposure originating from older brothers, which emerges as the dominant channel, and considers how this exposure operates within the school environment across outcomes.

Table 5: Effects of Exposure to Gateway Peers by Family Type

Peer Environment:	School-Grade		Neighborhood-Grade	
	(1) Gang-Related Offending (Ages 16–21)	(2) Listed in the Gang Register	(3) Gang-Related Offending (Ages 16–21)	(4) Listed in the Gang Register
Gateway Exposure by Relative Type:				
Father	-0.000	0.015	0.037^{+}	-0.006
	(0.035)	(0.021)	(0.020)	(0.012)
Brother	0.076**	0.037*	0.026	0.009
	(0.029)	(0.016)	(0.018)	(0.010)
Uncle	-0.028	-0.028*	-0.019	-0.006
	(0.019)	(0.011)	(0.012)	(0.006)
Cousin	0.022	0.010	-0.010	0.001
	(0.016)	(0.008)	(0.010)	(0.005)
Observations	292,144	292,144	292,144	292,144
Dep. Mean	0.047	0.013	0.047	0.013

Note.—Each column reports estimates from a separate regression based on equation (3), where exposure to gateway peers is defined based on older relatives' prior gang-related offending. Columns (1) and (2) use school-grade exposure, and columns (3) and (4) use neighborhood-grade exposure. Equation (3) is here extended to include one exposure variable for each relative type jointly. That is, exposure to gateway peers defined by: (i) fathers with prior gang-related offending, (ii) older siblings with prior gang-related offending, (iii) uncles with prior gang-related offending, and (iv) older cousins with prior gang-related offending. All regressions include calendar-year and school-neighborhood fixed effects, and exclude the gateway peers themselves from the estimation sample. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, ($^{+}$) $p < .1$

Which Relatives Generate Gateway Peers? Table 5 reports estimates from equation (3) linking exposure in grade 7 to GW peers with different types of gang-involved relatives to the focal student's outcomes between ages 16 and 21. Columns (1) and (2) measure exposure within the school-grade peer group, while columns (3) and (4) measure exposure within the neighborhood-grade peer group. The outcomes are gang-related offending between ages 16 and 21 and an indicator for whether the student is ever listed in the Gang Register. Each regression includes four exposure variables simultaneously, corresponding to GW peers defined by relatives with prior gang-related offending: fathers, brothers, uncles, and cousins.

The results indicate that brother-based GW exposure is the primary source of peer spillovers in the school environment. In the school-grade peer group (columns 1-2), the share of peers with gang-involved older brothers is positively associated with both outcomes. A 5 pp. increase in exposure to such peers raises the probability of gang-related offending by approximately 0.4 pp. and the probability of appearing in the Gang Register by about 0.2 pp. Relative to the sample means of 4.7 percent and 1.3 percent, these correspond to increases of roughly 8 and 14 percent, respectively. This pattern is in line with the

descriptive evidence in Figure 4, where brother-based exposure shows a clear positive raw relationship with later gang-related offending.

As the descriptive patterns suggest, uncle- and cousin-based exposure show little indication of increasing later offending or Gang Register listing. If anything, uncle-based exposure is negatively associated with Gang Register listing, and in the school-grade specification this estimate is statistically significant. Table A4 suggests that uncle-based GW peers differ meaningfully from brother-based GW peers. They are less likely to have a foreign background and appear to come from relatively more advantaged families. Uncles are also plausibly less likely than older brothers to interact directly with the focal student and the student's peer group. This pattern is consistent with uncle-based exposure identifying peers who are more socially distant from the gang-linked networks relevant for recruitment. If such networks are organized along lines of social similarity, uncle-based GW peers may be disproportionately drawn from groups that are less connected to those environments. In that case, uncle-based exposure would not be expected to generate links into gangs and could even be negatively associated with gang-related outcomes. I return to the role of homophily in Section 7.

Father-based exposure is more notable. In the descriptive figures, both father- and brother-based exposure display positive raw relationships with later gang-related offending. Once the four exposure measures are included jointly, however, only brother-based exposure shows systematically positive effects on both offending and Gang Register listing. One possibility is that, although parental offending helps identify peers from more disruptive or crime-prone family environments, older brothers are more likely to provide the direct links that translate into actual participation. Relative closeness in age may be important here. As discussed in the institutional background, recruitment in Swedish gangs is often described as operating through older adolescents who maintain direct contact with younger cohorts. Older brothers may therefore be more likely than parents to fall within the relevant recruiting margin and to connect GW peers and their school-grade peers to the networks in which more serious gang involvement occurs. Father-based exposure may thus be more informative about broader peer risk, whereas brother-based exposure appears more closely tied to the mechanisms that generate later gang participation and gang-related offending.

In columns (3) and (4), the estimated coefficients are smaller across all relative types and are not statistically distinguishable from zero.

Exposure from Older Brothers. Having established that school-grade exposure effects are primarily driven by peers with gang-involved older brothers, the remainder of the analysis focuses on this exposure channel. Table 6 presents estimates from equation (3) using GW exposure defined by older brothers. In contrast to Table 5, these specifications isolate brother-based exposure and do not include GW exposure defined through other relatives. The table reports results separately for school-grade and neighborhood-grade peer groups.

Table 6: Gateway Peer Exposure Defined by Older Brothers Gang-Related Offending

	Gang-Related Offense (Ages 16–21)			Listed in the Gang Register		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. School Exposure						
GW Exposure	0.076**	0.074*	0.073*	0.037*	0.035*	0.036*
	(0.029)	(0.029)	(0.029)	(0.017)	(0.016)	(0.016)
Panel B. Neighborhood Exposure						
GW Exposure	0.026	0.028	0.028	0.009	0.010	0.010
	(0.018)	(0.018)	(0.018)	(0.010)	(0.010)	(0.010)
Focal Controls		✓	✓		✓	✓
Peer Group Controls			✓			✓
Observations	292,144	292,144	292,144	292,144	292,144	292,144
Dep. Mean	0.047	0.047	0.047	0.013	0.013	0.013

Note.—Each cell reports the coefficient from a separate regression based on equation (3). Gateway peer exposure is defined using the prior offending history of peers' older brothers and varies across panels. *Panel A* uses school-grade exposure to peers whose older brothers have prior gang-related offending. *Panel B* uses neighborhood-grade exposure to peers whose older brothers have prior gang-related offending. All specifications include calendar-year and school-neighborhood fixed effects and exclude gateway peers themselves from the estimation sample. Columns labeled *Focal Controls* additionally include sex, an indicator for foreign background, single-parent household status, parental income, employment, and education, as well as indicators for missing values. Columns labeled *Peer-group Controls* additionally include the share male and the share with foreign background in the relevant peer group. Standard errors are two-way clustered at the school and neighborhood levels. $(^{**})$ $p < .01$, $(^{*})$ $p < .05$, $(^{+})$ $p < .1$.

Panel A reports estimates for school-grade exposure. Column (1) presents the baseline specification without additional controls. Columns (2) and (3) sequentially add controls for the focal student's background characteristics and for peer group composition. Across specifications, the estimated coefficients are stable in magnitude and statistically significant. A 5 pp. increase in exposure to peers with gang-involved older brothers increases the probability of gang-related offending by approximately 0.35–0.38 pp. and the probability of appearing in the Gang Register by about 0.18 pp. Relative to the sample means, these correspond to economically meaningful increases. The similarity of these estimates to those in Table 5 indicates that the results are not driven by correlated exposure to other types of GW peers.

Panel B reports the corresponding estimates for neighborhood-grade exposure. The coefficients are smaller in magnitude and not statistically distinguishable from zero across specifications. This pattern is consistent with the earlier evidence that peer spillovers are concentrated within the school environment rather than operating through residential proximity.

The estimates are stable across specifications and remain similar when adding controls for individual background and peer composition. They are also comparable to those obtained when jointly including other GW exposure measures. This pattern is consistent with

brother-based exposure capturing the primary source of peer spillovers within the school-grade peer group.

Relevant Peer Cohorts and the Absence of Neighborhood Effects. The analysis so far focuses on exposure to GW peers within the same birth cohort. This choice reflects both institutional features of the school environment and identification concerns. In compulsory school, students spend most of their time interacting with peers in their own grade through classes and other structured activities, making same-cohort peers the most salient margin for social interactions. However, exposure to older cohorts may be more easily observed by families and therefore more susceptible to endogenous responses, such as selective school choice or residential sorting.

To assess whether older peers contribute to peer spillovers, Table 7 reports estimates that separately include GW exposure from the focal student's own cohort (grade 7) and from older cohorts (grades 8 and 9) within the same school. Because this requires observing students with peers in adjacent cohorts, approximately 8,000 students are excluded from the sample. Panel A shows that exposure to GW peers in the focal cohort remains positively associated with both outcomes, with magnitudes similar to the baseline estimates, while exposure to older cohorts is small and not statistically distinguishable from zero. Panel B reports estimates using a joint measure of exposure across all three grades. The joint measure is positively associated with subsequent outcomes, indicating an overall school-level exposure effect, but the magnitude of the estimates suggests that this effect is largely driven by exposure within the focal cohort, with little contribution from older peers.

A large literature emphasizes the role of neighborhoods in shaping a range of individual outcomes, including crime, education, and labor market trajectories.[12] This raises the question of why comparable effects are not observed for neighborhood-based GW exposure in the baseline specifications.

One possibility is that the null results reflect limited statistical power. However, the estimates in Table 6 suggest that neighborhood effects would not be of the same order of magnitude as the school-based effects. For gang-related offending, a 5 pp. increase in neighborhood exposure implies a point estimate of 0.14 pp., with an upper bound of 0.32 pp. at the 95% confidence level. For Gang Register listing, the corresponding figures are 0.05 pp. and 0.15 pp. Even at the upper bound of the confidence interval, the implied effects remain smaller than the corresponding school-based estimates.

An alternative explanation is that the relevant peer margin differs in neighborhoods. Unlike schools, neighborhoods do not impose structured interactions by age, and peer contact

[12]See, for example, work on education and achievement in neighborhoods by Åslund et al. (2011) and Billings and Hoekstra (2023); on labor market and long-run mobility outcomes by Oreopoulos (2003), Damm (2014), Chetty et al. (2016), Chetty and Hendren (2018a), and Chetty and Hendren (2018b); and on crime and delinquency by Damm and Dustmann (2014), Billings et al. (2019), Billings and Schnepel (2020), Ludwig et al. (2001), and Kling et al. (2005). For broader or multi-outcome discussions, see Kling et al. (2007), Ross (2011), and Chyn and Katz (2021).

Table 7: Gateway Exposure Across Cohorts and Broader Peer Windows

	Gang-Related Offense (Ages 16-21)		Listed in the Gang Register	
	(1)	(2)	(3)	(4)
Panel A. GW Exposure in School (Separate by Grade)				
Grade 7 (Focal's Cohort)	0.077**	0.075**	0.034*	0.033*
	(0.029)	(0.029)	(0.016)	(0.016)
Grade 8 (one year older)	0.014	0.012	0.011	0.011
	(0.027)	(0.027)	(0.013)	(0.013)
Grade 9 (two years older)	-0.003	-0.008	0.012	0.010
	(0.023)	(0.023)	(0.014)	(0.014)
Panel B. GW Exposure in School (Overall in Upper Comp.)				
Joint (Grade 7–9)	0.106*	0.093^{+}	0.065*	0.060*
	(0.052)	(0.051)	(0.029)	(0.029)
Panel C. GW Exposure in Neighborhood (±2 Year Age Window)				
GW Peer Age 11–15	0.132**	0.088^{+}	0.060*	0.044
	(0.050)	(0.049)	(0.030)	(0.030)
Focal Controls		✓		✓
Peer Group Controls		✓		✓
Observations	286,633	286,633	286,633	286,633
Dep. Mean	0.045	0.045	0.013	0.013

Note.—Each column reports estimates from equation (3) using alternative definitions of peers in schools and neighborhoods. Panel A includes GW exposure in the school environment separately by cohort: the focal student's grade (grade 7) and older cohorts (grades 8 and 9). Panel B reports a joint measure of GW exposure across grades 7–9 within the same school. Panel C reports GW exposure in the neighborhood using a broader peer definition that includes individuals within a ±2 year age window. GW exposure is defined as the share of peers with older brothers who have prior gang-related offending. All specifications include calendar-year and neighborhood-school fixed effects. Columns (2) and (4) additionally include controls for individual background characteristics and peer group composition. The sample is restricted to students with observable peers in adjacent cohorts within the same school or neighborhood. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, ($^{+}$) $p < .1$.

is not organized around birth cohorts. As a result, same-cohort exposure may not capture the relevant set of interactions in residential settings. To examine this possibility, Panel C in Table 7 expands the definition of neighborhood peers to include individuals within a ±2 year age window. Under this broader definition, GW exposure in the neighborhood is positively associated with both gang-related offending and the probability of being listed in the Gang Register.

This pattern suggests that the baseline specification does not capture the relevant interaction margin in neighborhoods. Expanding the age window, however, requires stronger assumptions for a causal interpretation. Consistent with this, the estimates become more sensitive to the inclusion of controls. The results should therefore be interpreted as suggestive evidence on the relevant peer margin rather than as causal estimates comparable to those in the school setting.

Table 8: Outcomes by Crime Type and Alternative Criminal Exposure Measures

	Dependent Variables: Offense Type at Ages 16–21 or Listed in the Gang Register					
	(1) Any	(2) Violent	(3) Property	(4) Narcotics	(5) Other	(6) Listed
Panel A. GW Exposure (Brothers with Gang-Related Offending)						
School Exposure	0.170**	0.066*	0.051	0.088**	0.051+	0.037*
	(0.044)	(0.027)	(0.033)	(0.030)	(0.029)	(0.017)
Panel B. Complement Exposure (Brothers with Non-Gang Offending)						
School Exposure	-0.019	0.013	0.005	0.030	0.014	0.005
	(0.034)	(0.022)	(0.024)	(0.024)	(0.024)	(0.012)
Panel C. Exposure to Any Offending (Brothers with Any Offending)						
School Exposure	0.051+	0.034*	0.021	0.053**	0.028	0.016
	(0.028)	(0.017)	(0.020)	(0.019)	(0.019)	(0.010)
Obs.	292,144	292,144	292,144	292,144	292,144	292,144
Dep. Mean	0.169	0.049	0.059	0.067	0.065	0.013

Note.—Each column reports estimates from equation (3) relating peer exposure in grade 7 to subsequent outcomes between ages 16 and 21. Dependent variables indicate whether the individual commits any offense, or an offense in the listed category (violent, property, narcotics, other), or is listed in the Gang Register. Panel A uses GW exposure, defined as the share of peers with older brothers who have prior gang-related offending. Panel B uses complement exposure, defined as the share of peers with older brothers who have a criminal history that is not classified as gang-related. Panel C uses exposure defined by any prior offending among older brothers. All specifications measure exposure at the school-grade level and include calendar-year and neighborhood-school fixed effects. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

Outcomes by Crime Type and Alternative Criminal Exposure Measures. Table 8 reports estimates across crime types and alternative exposure definitions. Panel A shows that exposure to GW peers is associated with increases in overall offending, as well as in violent and narcotics offenses, and to a lesser extent other offenses. This pattern indicates that the influence of GW peers extends beyond narrowly defined gang-related activity, while remaining closely linked to behaviors associated with organized or group-based crime.

Panel B considers exposure to peers whose older brothers have a criminal history that is not classified as gang-related (complement exposure). The corresponding coefficients are small and not statistically distinguishable from zero across all outcomes. Panel C reports estimates using exposure defined by any prior offending among older brothers. While these estimates are positive for some outcomes, they are smaller in magnitude and less precisely estimated than those for GW exposure. Effects are primarily concentrated in overall, violent, and narcotics offending, with limited evidence of broader impacts across categories, and there is no corresponding effect on being listed in the Gang Register.

These patterns suggest that the effects of GW exposure are not fully captured by broader measures of criminal peer exposure. Exposure to peers with non-gang-related criminal older

brothers does not affect outcomes, and broader criminal exposure yields weaker and more selective effects. The concentration of effects in violent and narcotics offenses—categories commonly associated with organized or group-based criminal activity—and the absence of effects for property offenses are consistent with GW exposure capturing a distinct margin of peer influence. Only GW exposure increases the probability of being listed in the Gang Register. These findings suggest that GW exposure reflects more than broad delinquent peer influences and are consistent with a mechanism in which GW peers connect students to organized or group-based criminal networks. I further examine the potential underlying mechanisms in Section 7.

Magnitude and Comparison to Prior Estimates. A 5 pp. increase in school-grade exposure to gateway peers raises gang-related offending by about 8 percent and Gang Register listing by about 14 percent relative to the mean.[13] In a related school-based setting, Billings and Hoekstra (2023) find that a 5 pp. increase in peers linked to parental arrest raises adult arrest rates by about 5 percent. The corresponding effect here on any offending is also about 5 percent (Table 8). By contrast, exposure to peers whose older brothers have prior offending but no gang-related offending shows no detectable effect even on this broader outcome.

For neighborhoods, the baseline estimates differ from the broader literature. Damm and Dustmann (2014), for example, find that a 1 pp. increase in the neighborhood youth crime conviction rate raises later convictions by 7 to 13 percent relative to the mean, whereas I find no effect of same-cohort neighborhood exposure on gang-related offending or Gang Register listing. The comparison is not exact, however, since their exposure measure is defined over a much broader residential population than the one used here, so a given percentage-point change need not reflect the same underlying change in peer exposure. More importantly, the relevant neighborhood peer group may itself be broader than the same-cohort margin used in the baseline specification. In line with that view, when neighborhood exposure is defined over a broader age window, a 5 pp. increase implies an increase of about 23 percent relative to the mean for Gang Register listing and about 14.7 percent for future gang-related offending (Table 7). These magnitudes are closer to those in the neighborhood literature, although the broader-age peer estimates are only suggestive.

6.2 Robustness

Having established that exposure from older brothers in the school environment is the primary source of peer spillovers, I next assess the robustness of these findings. The exercises

[13] A back-of-the-envelope calculation suggests that school-based exposure to gateway peers linked through older brothers may account for about 295 individuals ($0.036 \times 0.028 \times 292{,}144$), with a 95% confidence interval of [46, 559]. This corresponds to 29.7% of males born between 2000 and 2006 who were listed in the Gang Register and had no relative with prior gang-related offending ($n = 991$).

consider alternative sample definitions, exposure measures, and peer environments to evaluate whether the results are sensitive to specific modeling choices.

Sample Restrictions and Alternative Peer Composition. To assess whether the results are driven by sample composition or correlated peer characteristics, I consider two sets of exercises. First, Appendix Figure A6 reports estimates under a range of sample restrictions, including excluding small and large peer groups, specific years, and the three major metropolitan areas in Sweden. The magnitude and precision of the estimates remain largely unchanged, indicating that the main results are not sensitive to these choices.

Second, I examine whether GW exposure is proxying for other observable peer characteristics. GW peers may differ systematically from other peers along dimensions such as gender, migration background, or parental characteristics. If so, the estimated effects could reflect these features rather than exposure to GW peers per se. Appendix Figure A7 reports estimates using exposure defined based on these characteristics, including the share of male peers, peers with a foreign background, and peers with different parental income, employment, and education. The estimated effects are small and not statistically distinguishable from zero. These patterns indicate that the main results are not driven by general features of peer groups, but rather the fact of being a GW peer.

Dynamics and Exposure Intensity. To examine how the effects evolve over time, I re-estimate equation (3) using cumulative indicators for gang-related offending at each age. As shown in Appendix Figure A8, the effects of school-based GW exposure increase from late adolescence into early adulthood. Neighborhood-based exposure follows a similar pattern but remains smaller in magnitude and is not statistically distinguishable from zero. These patterns are consistent with the main results and reinforce the importance of the school environment in driving the estimated effects.

To assess how effects vary with exposure intensity, I estimate specifications including a second-order polynomial in GW exposure and plot the implied marginal effects over the observed support of the treatment (0 to 0.1), as shown in Appendix Figure A9. The marginal effects increase with exposure and are concentrated at higher levels, with little evidence of effects at low exposure levels. This indicates that the main results are driven by students with relatively high exposure rather than marginal variation at the lower end of the distribution.

Peer Context and Interaction Environments. The main results show effects through school exposure rather than neighborhood exposure. However, this leaves open which subset of school peers drives these effects. In particular, relevant GW peers could be those who share both school and neighborhood, only school, or only neighborhood within the same cohort. To examine this, Appendix Table A9 decomposes exposure into peers who share only school, only neighborhood, or both, following Billings and Hoekstra (2023). This requires

restricting the sample to students who have peers in each of these categories, resulting in a slightly smaller sample. The results show that effects arise from school peers who do not live in the same neighborhood. Exposure to peers who share only neighborhood yields small and statistically insignificant estimates, consistent with the earlier neighborhood-based results, and there is no additional effect from peers who share both school and neighborhood. These findings indicate that schools bring together students from different neighborhoods, generating exposure to GW peers that does not arise from shared residential environments, rather than reflecting reinforced exposure to peers already connected through the neighborhood.

6.3 Heterogeneity

Building on these results, I then examine how the effects of exposure from older brothers in the school environment vary across contexts and individuals. These patterns provide further insight into the conditions under which this exposure translates into subsequent outcomes.

Local Gang Presence. If GW exposure operates through access to organized criminal networks, its effects should be stronger in areas where such networks are present. Where gang activity is limited, exposure to GW peers may be less likely to translate into subsequent gang-related outcomes.

In Sweden, gang activity is concentrated in urban areas. Figure A10 shows the geographic distribution of gang members across municipalities, with clear clustering around major cities. Motivated by this pattern, I re-estimate equation (3) across subsamples that differ in the likelihood of gang presence. Table 9 reports estimates separately for (i) county capitals and non-county capitals, (ii) neighborhoods with and without recorded gang presence, and (iii) areas with high and low shares of residents with a foreign background.

The estimates are systematically larger in areas where gangs are more likely to be present. For gang-related offending (Panel A), the coefficient is 0.185 in neighborhoods with gang presence, compared to 0.017 in areas without. A similar contrast emerges between high- and low-foreign-share areas, where the coefficients are 0.182 and 0.007, respectively. Differences between county capitals and non-county capitals are smaller, although the point estimates are larger in county capitals. Panel B shows a similar picture for being listed in the Gang Register: the estimates are positive in areas with gang presence and in high-foreign-share areas, but close to zero in the corresponding comparison groups. Columns (1) and (8) reproduce the baseline results, where a 5 pp. increase in GW exposure is associated with an increase of about 8 percent in gang-related offending and about 14 percent in the probability of being listed in the Gang Register, relative to the respective sample means. In county capitals, in neighborhoods with gang presence, and in high foreign-share areas (columns 2, 4, and 6), the corresponding magnitudes are comparable to or larger than in the full sample when evaluated relative to their means.

Table 9: Gateway Exposure in School by Local Gang Presence

Sample Restriction:	Main	County Capital	Non-County Capital	Gang Presence	No Gang Presence	High Foreign Share	Low Foreign Share
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. Dependent Variable: Gang-Related Offense (Ages 16–21)							
GW Exposure	0.076**	0.096+	0.058+	0.185**	0.017	0.182**	0.007
	(0.029)	(0.052)	(0.032)	(0.069)	(0.026)	(0.064)	(0.044)
Observations	292,144	130,415	161,729	58,321	233,823	68,576	75,697
Dep. Mean	0.047	0.052	0.042	0.090	0.036	0.089	0.034
Panel B. Dependent Variable: Listed in the Gang Register							
Sample Restriction:	Main	County Capital	Non-County Capital	Gang Presence	No Gang Presence	High Foreign Share	Low Foreign Share
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
GW Exposure	0.037*	0.082**	0.001	0.102*	0.007	0.089*	0.001
	(0.017)	(0.031)	(0.016)	(0.049)	(0.009)	(0.042)	(0.011)
Observations	292,144	130,415	161,729	58,321	233,823	68,576	75,697
Dep. Mean	0.013	0.017	0.010	0.051	0.004	0.043	0.004

Note.—Each column reports estimates from equation (3) relating school-grade GW exposure in grade 7 to subsequent outcomes. GW exposure is defined as the share of peers with older brothers who have prior gang-related offending. Panel A reports effects on gang-related offending (ages 16–21), and Panel B reports effects on being listed in the Gang Register. Sample restrictions are defined as follows: (i) *County capitals* include Stockholm (including Södertälje), Göteborg, Malmö, Uppsala, Västerås, Nyköping, Linköping, Jönköping, Växjö, Kalmar, Karlskrona, Visby, Halmstad, Karlstad, Örebro, Falun, Gävle, Östersund, Umeå, and Luleå; (ii) *Gang presence* is defined as a RegSO with at least five individuals listed in the Gang Register; and (iii) *High/low foreign share* is defined relative to the median share of foreign-born residents across RegSOs. All specifications include calendar-year and neighborhood-school fixed effects. Standard errors are two-way clustered at the school and neighborhood levels.
(**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

In non-county capitals, in areas without gang presence, and in low foreign-share areas, the implied changes are small. The same pattern holds for being listed in the Gang Register (columns 9, 11, and 13).

The evidence therefore suggests that GW exposure matters primarily where organized criminal networks are active. This is consistent with a mechanism in which GW peers facilitate access to such networks, rather than one in which delinquent peer influence operates similarly across locations.

Individual Risk Indicators. Descriptive patterns in Table 2 show that GW peers—and, even more so, students with later observed brothers in the Gang Register—are disproportionately drawn from disadvantaged backgrounds. They are more likely to have a foreign background, to live in non-two-parent households, and to be negatively selected on prior academic performance and parental income. This raises the question of whether the estimated effects reflect responses among the average student or instead operate primarily among students with less favorable starting conditions, in line with the anecdotal evidence discussed in Section 2.

To examine this, I extend equation (3) by interacting GW exposure with indicators for not belonging to these risk groups. Specifically, I consider indicators for being Swedish native, living in a two-parent household, having prior achievement above the first quartile, and having household income above the first quartile.[14] Each interaction is included separately, and each specification controls for the corresponding indicator variable (not reported). The results are reported in Table 10 for gang-related offending and for being listed in the Gang Register. In this setup, the coefficient on GW exposure captures the effect for students in the disadvantaged groups, defined as those with a foreign background, from non-two-parent households, in the bottom quartile of prior achievement, or in the bottom quartile of household income. The interaction terms show how these effects differ for students outside these groups.

The estimates imply substantially larger effects for students in the disadvantaged groups. Relative to the main specification, the baseline coefficients increase in every interaction specification for both outcomes. The interaction terms are negative throughout, implying much smaller effects for students outside these groups. In several cases, they offset most of the baseline coefficient, leaving implied effects close to zero. This is true across all dimensions considered, including family background, prior achievement, and household income. In magnitude terms, a 5 pp. increase in GW exposure implies sizable changes for students in the disadvantaged groups. For gang-related offending, the larger coefficients imply increases of roughly 18 to 24 percent relative to the mean, compared to about 8 percent in the baseline specification. For being listed in the Gang Register, the corresponding increases range from 25 to 60 percent, compared to about 14 percent in the baseline.

[14] Prior academic achievement is measured using standardized test scores from the grade 6 national assessments.

Table 10: Gateway Exposure in School and Heterogeneous Effects by Individual Risk Indicators

	Gang-Related Offense (Ages 16–21)					Listed in the Gang Register				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GW Exposure	0.076**	0.165**	0.202**	0.224**	0.172**	0.037*	0.143**	0.072*	0.163**	0.100**
	(0.029)	(0.061)	(0.050)	(0.051)	(0.057)	(0.017)	(0.041)	(0.030)	(0.031)	(0.033)
× Swedish-Native		-0.134*					-0.157**			
		(0.061)					(0.041)			
× Two-Parent Household			-0.167**					-0.047		
			(0.048)					(0.034)		
× Prior Achievement > 1st Quartile				-0.224**					-0.189**	
				(0.050)					(0.032)	
× HH. Income > 1st Quartile					-0.143*					-0.094**
					(0.060)					(0.036)
Observations	292,144	292,144	292,144	292,144	292,144	292,144	292,144	292,144	292,144	292,144
Dep. Mean	0.047	0.047	0.047	0.047	0.047	0.013	0.013	0.013	0.013	0.013

Note.—Each column reports estimates from equation (3) relating school-grade GW exposure in grade 7 to subsequent outcomes. GW exposure is defined as the share of peers with older brothers who have prior gang-related offending. Columns (1)–(5) report effects on gang-related offending (ages 16–21), and columns (6)–(10) report effects on being listed in the Gang Register. Interaction terms capture heterogeneity by individual characteristics: Swedish native, two-parent household, prior achievement above the first quartile, and household income above the first quartile. The coefficient on GW exposure corresponds to the effect for students in the complementary (at-risk) groups. All specifications include calendar-year and neighborhood-school fixed effects, and include controls for the corresponding indicator variables (not reported). Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

The results therefore suggest that the effects are borne by students from more disadvantaged backgrounds, as captured by family structure, prior achievement, and household income. For students outside these groups, the estimates are small and often close to zero. Exposure to GW peers thus does not appear to shift the broader student population toward serious crime or gang involvement, but instead matters for those who are already more vulnerable along these dimensions.

Gender Differences in Exposure and Response. Recent work commissioned by Swedish authorities has drawn greater attention to girls' and women's involvement in criminal networks, while also emphasizing that these environments remain overwhelmingly male and that girls' roles may be less fully captured by official classifications (Brottsförebyggande rådet 2025). Against this background, comparing exposure by the gender of the relative through whom GW exposure is defined and by the gender of the receiving student is informative along two dimensions. First, it helps assess whether the main brother-based GW measure captures a gang-specific source of peer exposure or instead reflects broader features of the GW peer's family background. If the earlier estimates mainly reflected that these peers come from generally high-risk or disadvantaged families, one might expect similar effects when exposure is instead defined through peers with older sisters who have comparable offending histories. If the signal instead appears only for the brother-based measure, that is more in line with the GW variable capturing exposure that is more closely tied to gang-related environments. Second, this comparison makes it possible to assess whether exposure also affects girls, which can be examined in the criminal registers by observing whether their later offending qualifies as gang-related, even if they are not listed in the Gang Register.

Table 11 reports the results. In the full sample, exposure defined through peers with gang-involved older brothers is positively related to both outcomes. For males, the magnitudes are essentially unchanged relative to the baseline results, even when brother- and sister-based exposure are included jointly. For females, the absolute effects are smaller. For gang-related offending, however, the implied increase remains meaningful relative to the much lower baseline rate, whereas for being listed in the Gang Register the estimate is small and imprecisely estimated. When GW exposure is instead defined through peers with gang-involved older sisters, the coefficients are close to zero throughout. These estimates should be interpreted with caution, since gang-related offending among older sisters is rare and the resulting exposure measure contains much less variation. Even so, the comparison is informative: once brother- and sister-based exposure are included side by side, the signal remains in the brother-based measure.

This is what one would expect if brother-based GW exposure picks up the family link most closely connected to gang-related environments, rather than simply reflecting a broader feature of the GW peer's family background. The weaker estimates for females, especially for being listed in the Gang Register, are also in line with recent reports that girls are less

Table 11: Gateway Exposure by Gender and Source of Exposure

Dependent Variables:	Gang-Related Offense (Ages 16–21)			Listed in the Gang Register		
	(1)	(2)	(3)	(4)	(5)	(6)
Student Sample:	All	Males	Female	All	Males	Females
GW Exp. (Brother)	0.047**	0.076**	0.020+	0.017*	0.038*	0.005
	(0.016)	(0.029)	(0.012)	(0.008)	(0.017)	(0.004)
GW Exp. (Sister)	0.003	-0.004	-0.001	-0.011	-0.024	-0.007
	(0.031)	(0.054)	(0.022)	(0.016)	(0.032)	(0.007)
Observations	568,368	292,144	276,224	568,368	292,144	276,224
Dep. Mean	0.028	0.047	0.009	0.007	0.013	0.001

Note.—Each column reports estimates from equation (3) relating school-grade GW exposure in grade 7 to subsequent outcomes. GW exposure is defined separately by exposure to peers with older brothers or older sisters who have prior gang-related offending. Columns (1)–(3) report effects on gang-related offending (ages 16–21), and columns (4)–(6) report effects on being listed in the Gang Register. Estimates are shown for the full sample, males, and females. All specifications include calendar-year and neighborhood-school fixed effects. Standard errors are two-way clustered at the school and neighborhood levels.
(**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

often recruited through the same hierarchical pathway as boys, more often enter these environments through social or romantic ties to network-involved males, and are less likely to remain in stable or clearly ranked positions within the network. Under that interpretation, brother-based exposure may affect girls' later offending even if it less often translates into the forms of gang involvement that are visible in police-based classifications. This interpretation remains suggestive. Gang-related offending may differ between males and females along margins not captured here, and even when girls are involved in gang environments, their activities may not be reflected in the same offending patterns that characterize the predominantly male population observed in gang-related crime and in the Gang Register. Still, the positive estimates for female offending suggest that brother-based exposure is not irrelevant for girls.

Education and Mental Health. The analysis so far has focused on outcomes that capture direct involvement in gang-related activities. I next examine education and mental health. This serves two purposes. First, it shows whether GW exposure has broader consequences than later offending and Gang Register listing. Second, it allows effects to appear along margins that may be more informative for girls. As discussed above, if girls are less likely to be captured in police-based gang classifications, exposure may still matter through school outcomes or mental health.

Table 12 reports estimates for mental health diagnoses during compulsory school, grade 9 educational outcomes, and mental health diagnoses up to age 21. The clearest evidence concerns mental health during compulsory school.

Table 12: Educational and Mental Health Effects of Gateway Exposure in Schools

	Mental Health Diagnoses (Age 13-15)		Grade 9 Education Outcomes			Mental Health Diagnoses (Ages 16–21)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mood	Stress	Standardized Test Score	Merit Score	High School Eligibility	Mood	Stress
Panel A. All Students							
GW Exposure	0.041**	0.033*	-0.119+	-7.577	-0.033	0.006	0.022
	(0.014)	(0.017)	(0.071)	(4.806)	(0.025)	(0.017)	(0.021)
Observations	563,393	563,393	563,393	562,749	562,749	563,393	563,393
Dep. Mean	0.035	0.053	0.073	230.001	0.905	0.050	0.077
Panel B. Male Students							
GW Exposure	0.020	0.014	-0.157+	-5.731	-0.008	-0.016	0.008
	(0.014)	(0.017)	(0.085)	(6.030)	(0.034)	(0.018)	(0.021)
Observations	289,544	289,544	289,544	289,231	289,231	289,544	289,544
Dep. Mean	0.019	0.031	-0.016	218.584	0.896	0.030	0.043
Panel C. Female Students							
GW Exposure	0.051*	0.050+	-0.064	-8.688	-0.046	0.019	0.034
	(0.024)	(0.029)	(0.084)	(6.370)	(0.033)	(0.029)	(0.035)
Observations	273,849	273,849	273,849	273,518	273,518	273,849	273,849
Dep. Mean	0.051	0.077	0.167	242.073	0.914	0.072	0.114

Note.—Each cell reports the coefficient from a separate regression based on equation (3). GW Exposure is defined as the share of school-grade peers whose older brothers have prior gang-related offenses. Panel A reports estimates for all students, Panel B reports estimates for male students, and Panel C for female students. Mood and stress outcomes are defined as receiving a relevant diagnosis between ages 13–15 (columns 1-2) or ages 16–21 (columns 6-7). Educational outcomes are measured at the end of Grade 9. Standardized Test Score refers to within-year standardized test scores in Swedish, English, and mathematics. Merit Score is the total sum of subject-grade points (comparable to GPA). High School Eligibility is an indicator for receiving passing grades in Swedish, English, and mathematics. All regressions include calendar-year and school-neighborhood fixed effects. Specifications additionally control for any mental health diagnosis prior to entry into upper-compulsory school, Grade 6 test scores, and an indicator for missing Grade 6 test scores. Gateway peers are excluded from the estimation sample. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$

In the full sample, GW exposure is associated with increases in both mood- and stress-related diagnoses between ages 13 and 15. Once the sample is split by sex, these effects appear to be driven mainly by girls. For female students, the estimates are positive for both outcomes and economically meaningful relative to the corresponding baseline rates, whereas for males the coefficients are smaller and imprecisely estimated. This is notable given the previous section: even if female students are less visible in gang measures, exposure may still affect them along other margins during adolescence.

There is some evidence of lower grade 9 standardized test scores, with the largest decline among males, but the estimates for merit score and high school eligibility are small and not statistically distinguishable from zero. The negative effect on test scores is therefore the only educational outcome that shows a consistent adverse response, and even here the evidence is more suggestive than decisive. For mental health diagnoses at ages 16–21, I find no clear effects in either the full sample or the sex-specific estimates. One possible interpretation is that distress may be more readily observed during compulsory school, when students remain in regular contact with school-based services, than later on. At the same time, these later estimates are imprecise, so the results are best read as showing no clear evidence of persistent effects in diagnosed mental health through age 21.

Overall, the results suggest that GW exposure affects outcomes beyond later criminal involvement, but mainly through mental health during compulsory school rather than through broader deterioration in educational attainment or diagnosed mental health in early adulthood. They also suggest that, for girls, some of the broader consequences of exposure may be more visible in health-related outcomes than in offending or police-based measures.

7 Mechanisms: Gang Recruitment or Just Bad Apples

The preceding results show that school-grade exposure to GW peers, defined through older brothers with prior gang-related offending, increases subsequent gang-related offending and Gang Register listing. The effects are also strongest in environments where gang activity is more prevalent and among students from more disadvantaged backgrounds. To further assess whether these patterns reflect a broader delinquent peer effect or a more specific mechanism related to gang recruitment and network access, I next examine three pieces of evidence: (i) co-offending patterns, (ii) homophily, and (iii) sibling presence.

7.1 Co-Offending.

If GW exposure operates only through direct peer influence, one would expect exposed students to become more likely to co-offend with the GW peers themselves. A mechanism involving gang recruitment or network access implies a broader pattern: exposure should also increase co-offending with the GW peers' relatives, especially their older brothers, and with individuals listed in the Gang Register. To examine this, I re-estimate equation (3)

Table 13: Gateway Exposure and Post-Compulsory School Co-Offending

	Post-Compulsory School Co-Offense with:						
	(1) GW Peer	(2) GW Peers' Family	(3) GW Peers' Parent	(4) GW Peers' Brother	(5) GW Peers' Uncle	(6) GW Peers' Cousin	(7) Individual Listed in the Gang Register
GW Exposure	0.070**	0.051*	-0.002	0.051*	0.004	0.007	0.050*
	(0.019)	(0.021)	(0.003)	(0.021)	(0.004)	(0.009)	(0.025)
Dep. Mean	0.011	0.015	0.000	0.013	0.001	0.004	0.022
Observations	292,144	292,144	292,144	292,144	292,144	292,144	292,144

Note.—Each column reports estimates from equation (3) relating school-grade GW exposure in grade 7 to post-compulsory school co-offending outcomes. GW exposure is defined as the share of peers with older brothers who have prior gang-related offending. The dependent variables indicate whether the focal student later co-offends with: (i) a GW peer, (ii) a GW peer's family member, (iii) a GW peer's parent, (iv) a GW peer's older brother, (v) a GW peer's uncle, (vi) a GW peer's cousin, or (vii) an individual listed in the Gang Register. All specifications include calendar-year and neighborhood-school fixed effects. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

using indicators for post-compulsory school co-offending with different groups. The results are reported in Table 13.

The estimates show that GW exposure increases the likelihood of later co-offending with GW peers themselves. A 5 pp. increase in exposure raises this probability by 0.35 pp., which corresponds to roughly 32 percent of the mean. Exposure also increases co-offending with the GW peers' family members. This effect is driven entirely by co-offending with the GW peers' older brothers: the corresponding increase is 0.26 pp., or about 20 percent of the mean. By contrast, I find no clear evidence of increased co-offending with GW peers' parents, uncles, or cousins. GW exposure also raises the probability of co-offending with an individual listed in the Gang Register. A 5 pp. increase in exposure implies an increase of 0.25 pp., or about 11 percent of the mean. This matters because the register-based outcome captures links beyond the GW peer and his immediate family.

The pattern of results is therefore broader than what one would expect from a purely dyadic peer effect. Exposure predicts later co-offending not only with the GW peer, but also with the GW peer's older brother and with individuals listed in the Gang Register. This is consistent with a mechanism in which GW exposure facilitates entry into wider criminal networks, rather than operating only through direct peer influence from the gateway peer.

7.2 Homophily and Parental Origin

Table 1 and Figure A11 show that individuals in the Gang Register are disproportionately drawn from certain second-generation immigrant backgrounds in Sweden. If social interactions are shaped by homophily, GW exposure may be more consequential when the focal student and the GW peer share parental origin. In this setting, parental origin can proxy for social proximity within the networks where gang-related activity takes place.

Table 14: Gateway Exposure, Parental-Origin Match, and Heterogeneous Effects by Parental Background

	Full Sample		Native Parentage		Foreign Parentage		Foreign Parentage (Frequent in Gang Register)	
	(1) Gang-Related Offense (Ages 16–21)	(2) Listed In the Gang Register	(3) Gang-Related Offense (Ages 16–21)	(4) Listed In the Gang Register	(5) Gang-Related Offense (Ages 16–21)	(6) Listed In the Gang Register	(7) Gang-Related Offense (Ages 16–21)	(8) Listed In the Gang Register
Panel A. Baseline								
GW Exposure	0.076**	0.037*	0.049*	0.016+	0.148+	0.075	0.197*	0.134*
	(0.029)	(0.017)	(0.024)	(0.009)	(0.080)	(0.048)	(0.092)	(0.058)
Panel B. By Parental Origin								
GW Exp. (Different Parental Origin)			0.007	0.069	0.007	-0.133*	0.015	-0.078
			(0.129)	(0.083)	(0.095)	(0.053)	(0.125)	(0.069)
GW Exp. (Shared Parental Origin)			0.058+	0.005	0.584**	0.805**	0.701**	0.781**
			(0.034)	(0.014)	(0.215)	(0.181)	(0.225)	(0.184)
Observations	292,144	292,144	231,659	231,659	51,349	51,349	38,109	38,109
Dep. Mean	0.047	0.013	0.031	0.003	0.107	0.051	0.116	0.060

Note.—Each column-panel combination reports estimates from equation (3) relating school-grade GW exposure in grade 7 to later outcomes. GW exposure is defined as the share of peers with older brothers who have prior gang-related offending. Estimates are reported for four samples: the full sample, students with at least one Swedish-born parent, students with no Swedish-born parent, and students with no Swedish-born parent where at least one parent is from a country that is frequently represented in the Gang Register (see Figure A11). Panel A reports the baseline estimates. Panel B splits GW exposure into exposure to peers who share at least one parental region of origin with the focal student and exposure to peers who do not. Parental regions of origin are grouped into the following categories: Sweden; other Nordic countries; Western and Central Europe; Eastern Europe and the Caucasus; Central and South Asia; East and Southeast Asia; the Middle East and North Africa; Sub-Saharan Africa; Latin America; North America; and Oceania. All specifications include calendar-year and neighborhood-school fixed effects. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

To assess this, I classify both students and GW peers by parental region of birth and decompose GW exposure into exposure to peers with shared versus different parental origin.

Table 14 reports the results. Panel A shows that the baseline brother-based GW estimate is smaller for students with Swedish parentage, larger for students with foreign parentage, and largest for students whose parental origins are overrepresented in the Gang Register. In the latter group, a 5 pp. increase in GW exposure raises gang-related offending by about 1.0 pp. and the probability of being listed in the Gang Register by about 0.7 pp., relative to means of 11.6 and 6.0 percent.

Panel B separates exposure by parental-origin match within these subgroups. Among students with Swedish parentage, the pattern differs across outcomes. For gang-related offending, the point estimate is larger for exposure to GW peers with shared parental origin. For Gang Register listing, the larger estimate instead loads on exposure to GW peers with different parental origin, although with imprecision. This suggests that homophily may matter more for the broader offending response, whereas Gang Register listing may depend more on whether exposed peers are connected to the relevant networks. Among students with foreign parentage, the pattern is clearer. The effects are concentrated among peers who share parental origin, both for gang-related offending and for Gang Register listing. A 5 pp. increase in shared-origin exposure raises gang-related offending by about 2.9 pp. and Gang Register listing by about 4.0 pp. The pattern seem driven by students whose parental origins are frequently represented in the Gang Register, for whom the corresponding increases are about 3.5 pp. and 3.9 pp. Exposure to GW peers with different parental origin remains close to zero and is sometimes negative. Together, these estimates suggest that shared parental origin may capture both social proximity in broader offending and access to the network connections that matter for later Gang Register inclusion.

These results also help interpret the negative uncle-based estimate in Table 5. As shown in Appendix Table A4, uncle-based GW peers are less likely to have a foreign background and appear to come from more advantaged families than brother-based GW peers. If gang-linked networks are socially concentrated in other groups, uncle-based exposure may disproportionately capture peers who are more socially distant from those environments. In that case, such exposure would be less likely to provide access to gangs and could even be negatively associated with gang-related outcomes. By contrast, the brother-based measure likely matters because it captures peers who are both socially closer to the focal student and more likely to provide links to gang-linked networks. Older brothers are closer in age, more likely to interact directly with the focal student and the student's peers, and therefore more likely to fall within the relevant recruiting margin.

7.3 Brother Presence and Availability

Brother Incarceration. If GW exposure operates through a recruitment channel driven by older brothers, then that channel should weaken when the brother is not available.

Table 15: Brother Incarceration

	(1) Gang-Related Offense (Ages 16–21)	(2) Listed in the Gang Register	(3) Co-Offend with GW Peer	(4) Co-Offend with GW Brother	(5) Co-Offend with Gang Member
GW Exp. (Brother No Inc.)	0.081**	0.042*	0.062**	0.062**	0.047+
	(0.030)	(0.018)	(0.019)	(0.022)	(0.025)
GW Exp. (Brother Inc. $<$ 1 Yr)	0.022	-0.049	0.139*	-0.055	0.066
	(0.098)	(0.065)	(0.064)	(0.067)	(0.080)
GW Exp. (Brother Inc. $\geq$ 1 Yr)	-0.191	-0.002	-0.154	-0.164	-0.113
	(0.168)	(0.104)	(0.105)	(0.126)	(0.152)
Observations	292,144	292,144	292,144	292,144	292,144
Dep. Mean	0.046	0.013	0.011	0.013	0.022

Note.—Each column reports estimates from equation (3). Gateway exposure is defined as the share of peers with older brothers who have prior gang-related offending. The specification includes three exposure measures simultaneously, corresponding to gateway peers whose older brothers were: (i) not incarcerated during grades 6–7, (ii) incarcerated for less than one year during grades 6–7, or (iii) incarcerated for at least one year during grades 6–7. Outcomes are indicated by the column headings. All regressions include calendar-year and neighborhood-school fixed effects. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

Incarceration provides such variation, but its interpretation depends on duration. Short spells may reflect more intensive criminal involvement without necessarily limiting contact, while longer spells are more likely to disrupt interactions and access to relevant networks. At the same time, incarceration may also generate a deterrence effect by increasing the perceived costs of involvement.

To examine this, I classify the brothers of GW peers into three categories: (i) not incarcerated during grades 6–7, (ii) incarcerated for less than one year, and (iii) incarcerated for at least one year, and include the corresponding exposure measures jointly in equation (3). Table 15 reports the results. Exposure to GW peers whose brothers are not incarcerated yields positive estimated effects across all outcomes. A 5 pp. increase in exposure raises gang-related offending by roughly 9 percent of the mean and increases the probability of being listed in the Gang Register by about 16 percent of the mean, alongside sizable increases in co-offending, including with both the GW peer and the brother. These estimates closely mirror the baseline results, indicating that the overall pattern is largely driven by GW peers whose brothers are present.

For GW peers whose brothers are incarcerated for less than one year, the estimates are imprecise and do not line up across outcomes. Co-offending with the GW peer remains positive, but the estimates for gang-related offending and listing inclusion are small or negative. A natural way to read this is that short incarceration spells load on two countervailing forces: they proxy for more entrenched criminal involvement of the brother, which may strengthen the underlying network channel, while at the same time introducing some degree of disruption or deterrence. When incarceration extends beyond one year, the point estimates turn negative across all outcomes. Although precision is limited, the shift in sign is consistent with a sharp reduction in the relevance of these peers for subsequent behavior. At this margin, the brother is plausibly absent for a sufficiently long period that both direct interaction and indirect access to the network are curtailed, and any signal about his criminal involvement becomes less actionable.

Rather than a uniform effect of incarceration, the results point to a change in the composition of forces as incarceration length increases: short spells mix signal and disruption, while longer spells primarily operate through reduced availability. This pattern is consistent with a setting in which the presence of the brother sustains access to relevant networks, and prolonged absence weakens that link, potentially reinforced by higher perceived costs of involvement.

Geographic Proximity of Brothers. Incarceration combines changes in availability with a potential deterrence effect. To isolate the role of physical presence more directly, I examine whether the older brother resides in the same municipality as the GW peer during grades 6–7.

Table 16: Brother Residency

	(1) Any Offense (Ages 16–21)	(2) Gang-Related Offending (Ages 16–21)	(3) Listed in the Gang Register	(4) Co-Offend with GW Peer	(5) Co-Offend with GW Brother	(6) Co-Offend with Gang Member
Panel A. Baseline						
GW Exposure	0.170**	0.076**	0.037*	0.070**	0.051*	0.050*
	(0.044)	(0.029)	(0.017)	(0.019)	(0.021)	(0.025)
Panel B. By GW Peer–Brother Municipality						
GW Exp. (Same Municipality)	0.175*	0.151**	0.059+	0.096**	0.083*	0.073
	(0.077)	(0.054)	(0.034)	(0.034)	(0.042)	(0.048)
GW Exp. (Different Municipality)	0.336**	0.129*	0.047	0.075*	0.043	0.053
	(0.087)	(0.054)	(0.032)	(0.033)	(0.035)	(0.040)
Dep. Mean	0.169	0.046	0.013	0.011	0.013	0.022
Observations	292,144	292,144	292,144	292,144	292,144	292,144

Note.—Each column-panel combination reports estimates from a separate regression based on equation (3), where school-grade GW exposure is defined by older brothers with prior gang-related offending. *Panel A* reports estimates from the baseline version of equation (3). *Panel B* extends the model to distinguish between two exposure measures: *GW Exp. (Same Municipality)*: exposure to GW peers whose older brother lives in the same municipality; *GW Exp. (Different Municipality)*: exposure to GW peers whose older sibling resides in a different municipality. Brother residence is measured at the time the focal student is in grade 7. All regressions include calendar-year and school-neighborhood fixed effects, and exclude the gateway peers themselves from the estimation sample. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$

If recruitment operates through interactions that require proximity, exposure effects should be stronger when the brother is locally present, even in the absence of any change in perceived costs.

Table 16 reports the results. Panel A reproduces the baseline estimates. In Panel B, I decompose exposure according to whether the GW peer's brother lives in the same or a different municipality. For general offending (column 1), the point estimate is in fact larger when the brother resides in a different municipality. This suggests that exposure to GW peers is sufficient to generate broader behavioral spillovers, even when the brother is not locally present. For outcomes more closely tied to gang activity, the pattern shifts. The estimated effects for gang-related offending, co-offending with the GW peer, and co-offending with gang members (columns 2, 4, and 6) are consistently smaller when the brother resides in a different municipality. These differences are not always large in absolute terms, but they are systematic. The sharpest contrast appears for co-offending with the GW brother (column 5), where the estimates are substantially larger when the brother is locally present, as one would expect given the need for direct interaction.

Since residential proximity does not directly affect the severity of the brother's criminal involvement or the perceived costs of offending, these differences are unlikely to reflect deterrence. Instead, they point to a role for proximity in shaping how GW exposure translates into more network-dependent outcomes. While peer interactions alone appear sufficient to affect general offending, outcomes that rely on coordination or direct links to more established offenders are more strongly associated with GW peers whose brothers are nearby.

Brother–GW Peer Age Gap. As discussed above, one reason brother-based GW exposure may be especially relevant is that older brothers are more likely to be close enough in age to interact directly with younger cohorts. A complementary way to assess this mechanism is therefore to examine the age gap between the GW peer and his older brothers. Smaller age gaps are more likely to correspond to the modal recruiting margin, where older adolescents interact directly with younger cohorts, while larger gaps may reflect weaker interaction or roles less directly tied to recruitment.

Figure 5 reports estimates from specifications that include exposure measures defined over quartiles of the age-gap distribution simultaneously. By construction, the minimum age gap is three years, since the older brother must be at least 15 at the time of the qualifying offense while the GW peer is at most in grade 6. The quartiles therefore capture progressively larger gaps above this lower bound. For general offending (subfigure a), the estimates are positive across all age-gap groups. The confidence intervals are wider, despite higher baseline prevalence of offending, suggesting that these outcomes are less tightly linked to the specific channel captured by the age-gap variation.

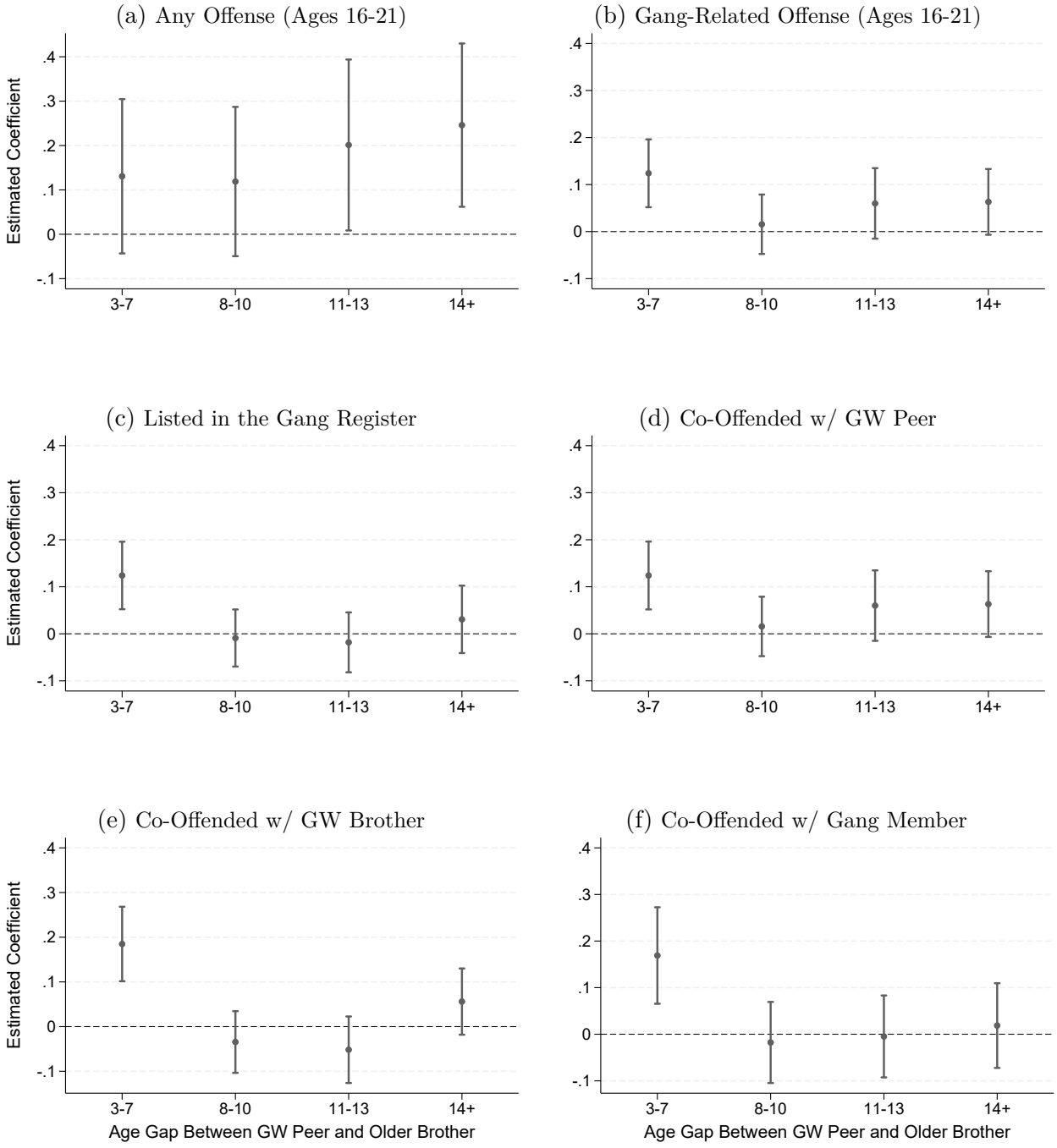


Figure 5: Age Gap Between GW Peers and Their Older Brothers

Note.—Coefficients are estimated from a modified version of equation (3), in which four measures of school-level GW exposure are included jointly. Each measure corresponds to exposure to gateway peers in the same school cohort whose mean age gap with their older brothers falls within a specific quartile of the age-gap distribution (measured in years). Age gaps are defined as the difference in age between the GW peer and their older brother. Because the older brother's criminal offense must occur before the GW peer enters grade 7—typically around age 12—and the brother must be at least 15, the age of criminal responsibility in Sweden, the minimum observable age gap is three years. Dependent variables are indicated by the subfigure captions. All regressions include school-neighborhood and calendar-year fixed effects and exclude the GW peers themselves from the estimation sample. Standard errors are two-way clustered at the school and neighborhood levels. 95% confidence intervals are reported.

In this sense, general offending appears less sensitive to whether the brother is in a position to directly interact with the focal cohort.

A different pattern emerges for outcomes more closely tied to gang involvement. Across Panels (b) to (f), the effects are driven by GW peers with older brothers who are closer in age. As the age gap increases, the point estimates move toward zero, while remaining similarly precise across groups. In other words, only the lowest age-gap quartile yields positive and precisely estimated effects, whereas exposure through relatively older brothers suggest no impact on these outcomes.

As the age gap increases, the estimates decline toward zero, indicating that the relevance of exposure depends on how closely the brother aligns with the focal cohort. Exposure to GW peers translates into network-linked outcomes only when the brother is close enough in age to interact with the focal cohort. This aligns with reports discussed in Section 2, which describe recruitment as operating through older adolescents who maintain direct contact with younger cohorts. For larger age gaps, exposure remains associated with broader offending, but it no longer maps into outcomes that require direct links to the brother or the surrounding network.

8 Conclusion

This paper studies how gang-related behavior spreads through family and peer networks in Sweden. I focus on GW peers—students whose older relatives have prior gang-related offending and who may connect family-based criminal networks to the peer environments in which students interact. A central contribution of the paper is the use of newly linked administrative data combining criminal records, kinship links, school and neighborhood identifiers, health and education outcomes, and Gang Register listing. These data make it possible to move beyond broad measures of delinquency and study whether peer exposure predicts later outcomes that are more closely tied to organized criminal networks.

The analysis asks which family links generate GW exposure that matters for later outcomes, and whether this exposure operates through schools, neighborhoods, or both. Across family links, the results point clearly to older brothers. Exposure to peers whose older brothers have prior gang-related offending is the only GW measure that consistently predicts later gang-related offending and Gang Register listing. I study both school and neighborhood exposure throughout the paper, but the clearest evidence is concentrated in the school environment. A broader neighborhood peer definition that allows for age differences yields suggestive positive estimates, but the main results point to schools as the setting in which GW exposure matters most.

In magnitude, the effects are economically meaningful and larger for outcomes that are more closely tied to gangs. A 5 pp. increase in school-based GW exposure defined by brothers raises gang-related offending by about 9 percent, and Gang Register listing

by about 14 percent. A simple back-of-the-envelope calculation further suggests that this exposure can account for about 30 percent of Gang Register listings among individuals in the relevant cohorts who do not have a relative with prior gang-related offending.

Several additional findings sharpen the interpretation of these results. Exposure to GW peers increases later co-offending not only with the GW peer, but also with the GW peer's older brother and with individuals listed in the Gang Register. The effects are stronger in places where gangs are more likely to be active and among students with weaker initial conditions. They are also concentrated among peers who share parental origin when that origin is more strongly represented in the Gang Register. The role of older brothers becomes clearer when I examine their availability and proximity: the estimates weaken when the brother is incarcerated for a prolonged period, become less gang-specific when he lives outside the local area, and are concentrated among brothers who are closer in age to the GW peer. Taken together, these patterns are more consistent with GW peers providing access to organized criminal networks than with peer influence operating only through the GW peer's own behavior.

The results also extend beyond later gang involvement itself. Gateway exposure increases overall offending, with the clearest responses appearing in violent and narcotics offenses. It is also associated with worse mental health during compulsory school, especially for girls, while the evidence on educational outcomes is more limited and the evidence on later diagnosed mental health is less clear. These broader effects suggest that GW exposure may affect both criminal behavior and the school environment in ways that matter even when it does not translate into the most visible forms of gang affiliation.

A broader implication of the findings is that peer effects in crime depend not only on peers' own behavior, but also on the networks to which peers are connected. Exposure to peers with family ties to gang-related offending appears to affect later gang-related outcomes through a mechanism that goes beyond a broad delinquent peer effect. At the same time, the results show that not all family-linked exposure is equally relevant. Relatives' criminal histories may help identify peers from more delinquent environments, but only some GW peers appear to capture the intermediary ties that plausibly facilitate recruitment into organized criminal groups. The relevant GW peers seem to be those who are socially proximate — through kinship, age, and broader social characteristics — both to the focal student and to the networks in which gang activity takes place. In that sense, the expansion of organized criminal groups may depend not only on the presence of high-risk youth, but also on whether local peer environments contain the specific social links through which older criminal networks can reach younger cohorts.

A policy implication is therefore that interventions targeted at GW peers themselves may have benefits that extend beyond those individuals. To the extent that some GW peers connect other students in the same school or neighborhood to broader criminal networks, helping or redirecting these peers may also reduce harmful exposure for the students

around them. The findings further suggest that vulnerability to such exposure is concentrated among disadvantaged students and in environments where gangs are more likely to be active. GW exposure thus appears most consequential where underlying disadvantage, social proximity, and network access overlap. This points to the value of targeted prevention efforts focused on the specific school and neighborhood settings where older criminal networks are most able to reach younger cohorts, rather than treating all delinquent peer exposure as equivalent. At the same time, the analysis does not identify the equilibrium effects of broader interventions that change peer composition or intensify monitoring. Such interventions may reduce harmful exposure, but they may also increase actual or perceived marginalization among already disadvantaged students. The estimates in this paper therefore support the importance of targeted prevention, but they do not by themselves identify the welfare effects of broader interventions of that kind.

References

Acemoglu, Daron, Giuseppe De Feo, and Giacomo Davide De Luca (2019). "Weak States: Causes and Consequences of the Sicilian Mafia". *The Review of Economic Studies*.

Adermon, Adrian, Mikael Lindahl, and Mårten Palme (2021). "Dynastic Human Capital, Inequality, and Intergenerational Mobility". *American Economic Review*.

Altonji, Joseph G., Sarah Cattan, and Iain Ware (2017). "Identifying Sibling Influence on Teenage Substance Use". *Journal of Human Resources*.

Ammermueller, Andreas and Jörn-Steffen Pischke (2009). "Peer Effects in European Primary Schools: Evidence from the Progress in International Reading Literacy Study". *Journal of Labor Economics*.

Angrist, Joshua D. (2014). "The Perils of Peer Effects". *Labour Economics*.

Angrist, Joshua D. and Kevin Lang (2004). "Does School Integration Generate Peer Effects? Evidence from Boston's Metco Program". *American Economic Review*.

Barone, Guglielmo and Gaia Narciso (2015). "Organized Crime and Business Subsidies: Where Does the Money Go?" *Journal of Urban Economics*.

Bayer, Patrick, Randi Hjalmarsson, and David Pozen (2009). "Building Criminal Capital behind Bars: Peer Effects in Juvenile Corrections". *The Quarterly Journal of Economics*.

Besemer, Sytske and David P. Farrington (2012). "Intergenerational Transmission of Criminal Behaviour: Conviction Trajectories of Fathers and Their Children". *European Journal of Criminology*.

Bhuller, Manudeep, Gordon B. Dahl, Katrine V. Loken, and Magne Mogstad (2018). "Intergenerational Effects of Incarceration". *AEA Papers and Proceedings*.

Bifulco, Robert, Jason M. Fletcher, and Stephen L. Ross (2011). "The Effect of Classmate Characteristics on Post-secondary Outcomes: Evidence from the Add Health". *American Economic Journal: Economic Policy*.

Billings, Stephen, David J. Deming, and Stephen L. Ross (2019). "Partners in Crime". *American Economic Journal: Applied Economics*.

Billings, Stephen and Kevin T. Schnepel (2020). "Hanging Out with the Usual Suspects: Neighborhood Peer Effects and Recidivism". *Journal of Human Resources*.

Billings, Stephen B. and Mark Hoekstra (2023). "The Effect of School and Neighborhood Peers on Achievement, Misbehavior, and Adult Crime". *Journal of Labor Economics*.

Björklund, Anders, Per-Anders Edin, Peter Fredriksson, and Alan Krueger (2004). *Education, equality, and efficiency - An analysis of Swedish school reforms during the 1990s*. IFAU - Institute for Evaluation of Labour Market and Education Policy.

Brottsförebyggande rådet (2016). *Kriminella nätverk och grupperingar: polisers bild av maktstrukturer och marknader*.

— (2021a). *Dödligt skjutvapenvåld i Sverige och andra europeiska länder: en jämförande studie av nivåer, trender och våldsmetoder*.

— (2021b). *Narkotikamarknader*.

— (2023). *Barn och unga i kriminella nätverk*.

— (2024a). *Dödligt våld i Sverige sedan 1990 - Omfattning, utveckling och karaktär*.

— (2024b). *Ökningen av skjutvapenvåld i Sverige*.

— (2025). "Flickor och kvinnor i kriminella nätverk".

Bruhn, Jesse (2021). "Competition in the Black Market: Estimating the Causal Effect of Gangs in Chicago". *SSRN Electronic Journal*.

Böhlmark, Anders, Helena Holmlund, and Mikael Lindahl (2016). "Parental Choice, Neighbourhood Segregation or Cream Skimming? An Analysis of School Segregation after a Generalized Choice Reform". *Journal of Population Economics*.

Campedelli, Gian Maria, Gianmarco Daniele, and Marco Le Moglie (2024). *Mafia, Politics and Machine Predictions*.

Carrell, Scott E., Richard L. Fullerton, and James E. West (2009). "Does Your Cohort Matter? Measuring Peer Effects in College Achievement". *Journal of Labor Economics*.

Carrell, Scott E., Mark Hoekstra, and Elira Kuka (2018). "The Long-Run Effects of Disruptive Peers". *American Economic Review*.

Carrell, Scott E. and Mark L. Hoekstra (2010). "Externalities in the Classroom: How Children Exposed to Domestic Violence Affect Everyone's Kids". *American Economic Journal: Applied Economics*.

Carrell, Scott E. and James E. West (2010). "Does Professor Quality Matter? Evidence from Random Assignment of Students to Professors". *Journal of Political Economy*.

Carvalho, Leandro S. and Rodrigo R. Soares (2016). "Living on the Edge: Youth Entry, Career and Exit in Drug-Selling Gangs". *Journal of Economic Behavior & Organization*.

Chetty, Raj and Nathaniel Hendren (2018a). "The Impacts of Neighborhoods on Intergenerational Mobility I: Childhood Exposure Effects*". *The Quarterly Journal of Economics*.

— (2018b). "The Impacts of Neighborhoods on Intergenerational Mobility II: County-Level Estimates*". *The Quarterly Journal of Economics*.

Chetty, Raj, Nathaniel Hendren, and Lawrence F. Katz (2016). "The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment". *American Economic Review*.

Chyn, Eric and Lawrence F. Katz (2021). "Neighborhoods Matter: Assessing the Evidence for Place Effects". *Journal of Economic Perspectives*.

Cook, Philip J., Jens Ludwig, Sudhir Venkatesh, and Anthony A. Braga (2007). "Underground Gun Markets". *The Economic Journal*.

Damm, Anna Piil (2014). "Neighborhood Quality and Labor Market Outcomes: Evidence from Quasi-Random Neighborhood Assignment of Immigrants". *Journal of Urban Economics*. Spatial Dimensions of Labor Markets.

Damm, Anna Piil and Christian Dustmann (2014). "Does Growing Up in a High Crime Neighborhood Affect Youth Criminal Behavior?" *The American Economic Review*.

Damm, Anna Piil and Cédric Gorinas (2020). "Prison as a Criminal School: Peer Effects and Criminal Learning behind Bars". *The Journal of Law and Economics*.

Daniele, Gianmarco and Gemma Dipoppa (2017). "Mafia, Elections and Violence against Politicians". *Journal of Public Economics*.

De Feo, Giuseppe and Giacomo Davide De Luca (2017). "Mafia in the Ballot Box". *American Economic Journal: Economic Policy*.

Dell, Melissa (2015). "Trafficking Networks and the Mexican Drug War". *American Economic Review*.

Deming, David J. (2011). "Better Schools, Less Crime? *". *The Quarterly Journal of Economics*.

Dooley, Brendan D., Alan Seals, and David Skarbek (2014). "The Effect of Prison Gang Membership on Recidivism". *Journal of Criminal Justice*.

Dustmann, Christian and Rasmus Landersø (2021). "Child's Gender, Young Fathers' Crime, and Spillover Effects in Criminal Behavior". *Journal of Political Economy*.

Dustmann, Christian, Mikkel Mertz, and Anna Okatenko (2023). "Neighbourhood Gangs, Crime Spillovers and Teenage Motherhood". *The Economic Journal*.

Eriksson, Karin Hederos, Randi Hjalmarsson, Matthew J. Lindquist, and Anna Sandberg (2016). "The Importance of Family Background and Neighborhood Effects as Determinants of Crime". *Journal of Population Economics*.

Finlay, Keith, Michael Mueller-Smith, and Brittany Street (2023). "Children's Indirect Exposure to the U.S. Justice System: Evidence From Longitudinal Links between Survey and Administrative Data*". *The Quarterly Journal of Economics*.

Gerell, Manne, Per-Olof Hallin, Kim Nilvall, and Stig Westerdahl (2020). *Att vända utvecklingen : från utsatta områden till trygghet och delaktighet*.

Gerell, Manne, Joakim Sturup, Mia-Maria Magnusson, Kim Nilvall, Ardavan Khoshnood, and Amir Rostami (2021). "Open Drug Markets, Vulnerable Neighbourhoods and Gun Violence in Two Swedish Cities". *Journal of Policing, Intelligence and Counter Terrorism*.

Grogger, Jeffrey (2002). "The Effects of Civil Gang Injunctions on Reported Violent Crime: Evidence from Los Angeles County". *The Journal of Law & Economics*.

Grönqvist, Hans, Susan Niknami, Mårten Palme, and Mikael Priks (2024). "The Intergenerational Effects of Parental Incarceration". *IFN Working Paper*.

Gupta, Arpit, Christopher Hansman, and Evan Riehl (2022). *Community Impacts of Mass Incarceration*.

Göteborgs universitet (2023). *Svenska Demokratitrender 1986-2023*. SOM-Institute.

Hjalmarsson, Randi and Matthew J. Lindquist (2012). "Like Godfather, Like Son: Exploring the Intergenerational Nature of Crime". *Journal of Human Resources*.

Holmlund, Helena, Anna Sjögren, and Björn Öckert (2020). *Jämlikhet i möjligheter och utfall i den svenska skolan*. IFAU - Institute for Evaluation of Labour Market and Education Policy.

Hoxby, Caroline (2000). "The Effects of Class Size on Student Achievement: New Evidence from Population Variation". *The Quarterly Journal of Economics*.

Imberman, Scott A., Adriana D. Kugler, and Bruce I. Sacerdote (2012). "Katrina's Children: Evidence on the Structure of Peer Effects from Hurricane Evacuees". *American Economic Review*.

Johnsen, Julian and Laura Khoury (2024). "Peer Effects in Prison". *SSRN Electronic Journal*.

Junger, Marianne, Jack Greene, Ruth Schipper, Floreyne Hesper, and Veronique Estourgie (2013). "Parental Criminality, Family Violence and Intergenerational Transmission of Crime within a Birth Cohort Special Issue on: Compassionate Criminology: The Legacy of Josine Junger-Tas". *European Journal on Criminal Policy and Research*.

Jönsson, Elin and Erik Nilsson (2019). *Skjutningar i kriminella miljöer: en intervjustudie*.

Kim, Jinho and Jason M. Fletcher (2017). "The Influence of Classmates on Adolescent Criminal Activities in the United States". *Deviant Behavior*.

Kling, Jeffrey R., Jeffrey B. Liebman, and Lawrence F. Katz (2007). "Experimental Analysis of Neighborhood Effects". *Econometrica*.

Kling, Jeffrey R., Jens Ludwig, and Lawrence F. Katz (2005). "Neighborhood Effects on Crime for Female and Male Youth: Evidence from a Randomized Housing Voucher Experiment*". *The Quarterly Journal of Economics*.

Kristoffersen, Jannie Helene Grøne, Morten Visby Krægpøth, Helena Skyt Nielsen, and Marianne Simonsen (2015). "Disruptive School Peers and Student Outcomes". *Economics of Education Review*.

Krüsselmann, Katharina, Aarten Pauline, Granath ,Sven, Janne Kivivuori, Nora Markwalder, Karoliina Suonpää, Thomsen Hedegaard Asser, Simone Walser, and Liem Marieke (2023). "Firearm Homicides in Europe: A Comparison with Non-Firearm Homicides in Five European Countries". *Global Crime*.

Larsen, Britt Østergaard and Nicolai Kristensen (2017). "Building Human or Criminal Capital? School Peer Effects on Future Offending".

Lavy, Victor and Analía Schlosser (2011). "Mechanisms and Impacts of Gender Peer Effects at School". *American Economic Journal: Applied Economics*.

Lefgren, Lars (2004). "Educational Peer Effects and the Chicago Public Schools". *Journal of Urban Economics*.

Levitt, Steven D. and Sudhir Alladi Venkatesh (2000). "An Economic Analysis of a Drug-Selling Gang's Finances". *The Quarterly Journal of Economics*.

Lubotsky, Darren and Martin Wittenberg (2006). "Interpretation of Regressions with Multiple Proxies". *The Review of Economics and Statistics*.

Ludwig, J., G. J. Duncan, and P. Hirschfield (2001). "Urban Poverty and Juvenile Crime: Evidence from a Randomized Housing-Mobility Experiment". *The Quarterly Journal of Economics*.

Ludwig, Jens and Jeffrey R. Kling (2007). "Is Crime Contagious?" *The Journal of Law & Economics*.

Manski, Charles F. (1993). "Identification of Endogenous Social Effects: The Reflection Problem". *The Review of Economic Studies*.

Melnikov, Nikita, Carlos Schmidt-Padilla, and Maria Micaela Sviatschi (2020). *Gangs, Labor Mobility and Development*.

Moffitt, Robert A. (2001). "Policy Interventions, Low-Level Equilibria, and Social Interactions". *Social Dynamics*. Ed. by Steven N. Durlauf and H. Peyton Young.

Monteiro, Joana and Rudi Rocha (2017). "Drug Battles and School Achievement: Evidence from Rio de Janeiro's Favelas". *The Review of Economics and Statistics*.

Murray, Joseph and David P. Farrington (2008). "The Effects of Parental Imprisonment on Children". *Crime and Justice*.

Mörtlund, Tove (2020). *Arbetet med nyanlända elever i grundskolan*. IFAU - Institute for Evaluation of Labour Market and Education Policy.

Norris, Samuel, Matthew Pecenco, and Jeffrey Weaver (2021). "The Effects of Parental and Sibling Incarceration: Evidence from Ohio". *American Economic Review*.

Ohinata, Asako and Jan C. van Ours (2013). "How Immigrant Children Affect the Academic Achievement of Native Dutch Children". *The Economic Journal*.

Oreopoulos, Philip (2003). "The Long-Run Consequences of Living in a Poor Neighborhood*". *The Quarterly Journal of Economics*.

Ouss, Aurelie (2011). *Prison as a School of Crime: Evidence from Cell-Level Interactions*.

Papachristos, Andrew V., Anthony A. Braga, and David M. Hureau (2012). "Social Networks and the Risk of Gunshot Injury". *Journal of Urban Health*.

Philippe, Arnaud (2024). "Building Criminal Networks in Prison: Evidence from French Cell- Mates"".

Pinotti, Paolo (2015). "The Economic Costs of Organised Crime: Evidence from Southern Italy". *The Economic Journal*.

Polismyndigheten (2021). *Lärdomar från Encrochat*.

— (2025). *Svensk polis leder operation Grimm*.

Ross, Stephen L. (2011). "Social Interactions within Cities: Neighborhood Environments and Peer Relationships". *The Oxford Handbook of Urban Economics and Planning*. Ed. by Nancy Brooks, Kieran Donaghy, and Gerrit-Jan Knaap.

Rostami, Amir and Hernan Mondani (2023). *2023:3 Kriminella på kartan – en ESO-rapport om den organiserade brottslighetens geografi*.

Rostami, Amir, Jerzy Sarnecki, Hernan Mondani, Christofer Edling, and Joakim Sturup (2018). *Våldsbejakande extremism och organiserad brottslighet i Sverige*. Institutet för Framtidsstudier.

Sacerdote, Bruce (2001). "Peer Effects with Random Assignment: Results for Dartmouth Roommates". *The Quarterly Journal of Economics*.

Sjögren, Anna, Anton Sundberg, and Demid Getik (2024). *Migration Inflow and the School Performance of Incumbent Students*. IFAU - Institute for Evaluation of Labour Market and Education Policy.

Skarbek, David (2010). "Putting the "Con" into Constitutions: The Economics of Prison Gangs". *Journal of Law, Economics, & Organization*.

Sobrino, Fernanda (2020). "Mexican Cartel Wars: Fighting for the U.S. Opioid Market". *Working Paper*.

Stevenson, Megan (2017). "Breaking Bad: Mechanisms of Social Influence and the Path to Criminality in Juvenile Jails". *The Review of Economics and Statistics*.

Sturup, Joakim, Amir Rostami, Hernan Mondani, Manne Gerell, Jerzy Sarnecki, and Christofer Edling (2019). "Increased Gun Violence Among Young Males in Sweden: A Descriptive National Survey and International Comparison". *European Journal on Criminal Policy and Research*.

Suonpää, Karoliina, Janne Kivivuori, Pauline Aarten, Andri Ahven, Sven Granath, Nora Markwalder, Sara Skott, Asser H. Thomsen, Simone Walser, and Marieke Liem (2024). "Homicide Drop in Seven European Countries: General or Specific across Countries and Crime Types?" *European Journal of Criminology*.

Sviatschi, Maria Micaela (2022a). "Making a NARCO: Childhood Exposure to Illegal Labor Markets and Criminal Life Paths". *Econometrica*.

— (2022b). "Spreading Gangs: Exporting US Criminal Capital to El Salvador". *American Economic Review*.

SVT (2025). *Uppdrag granskning – Gängskolan*.

Säkerhetspolisen (2024). *Iran använder kriminella i Sverige*.

UNODC (2023). *Global Study on Homicide*.

Åslund, Olof, Per-Anders Edin, Peter Fredriksson, and Hans Grönqvist (2011). "Peers, Neighborhoods, and Immigrant Student Achievement: Evidence from a Placement Policy". *American Economic Journal: Applied Economics*.

Öberg, Jonas (2015). *Skjutningar 2006 och 2014*.

Örnlind, Henrik and Torbjörn Forkby (2025). *Det gängrelaterade skjutvapenvåldet – en kunskapsöversikt : Dynamiken bakom skjutvapenvåldet och en orientering i varför det skjuts mer sällan i Jönköping*.

A Appendix Figures

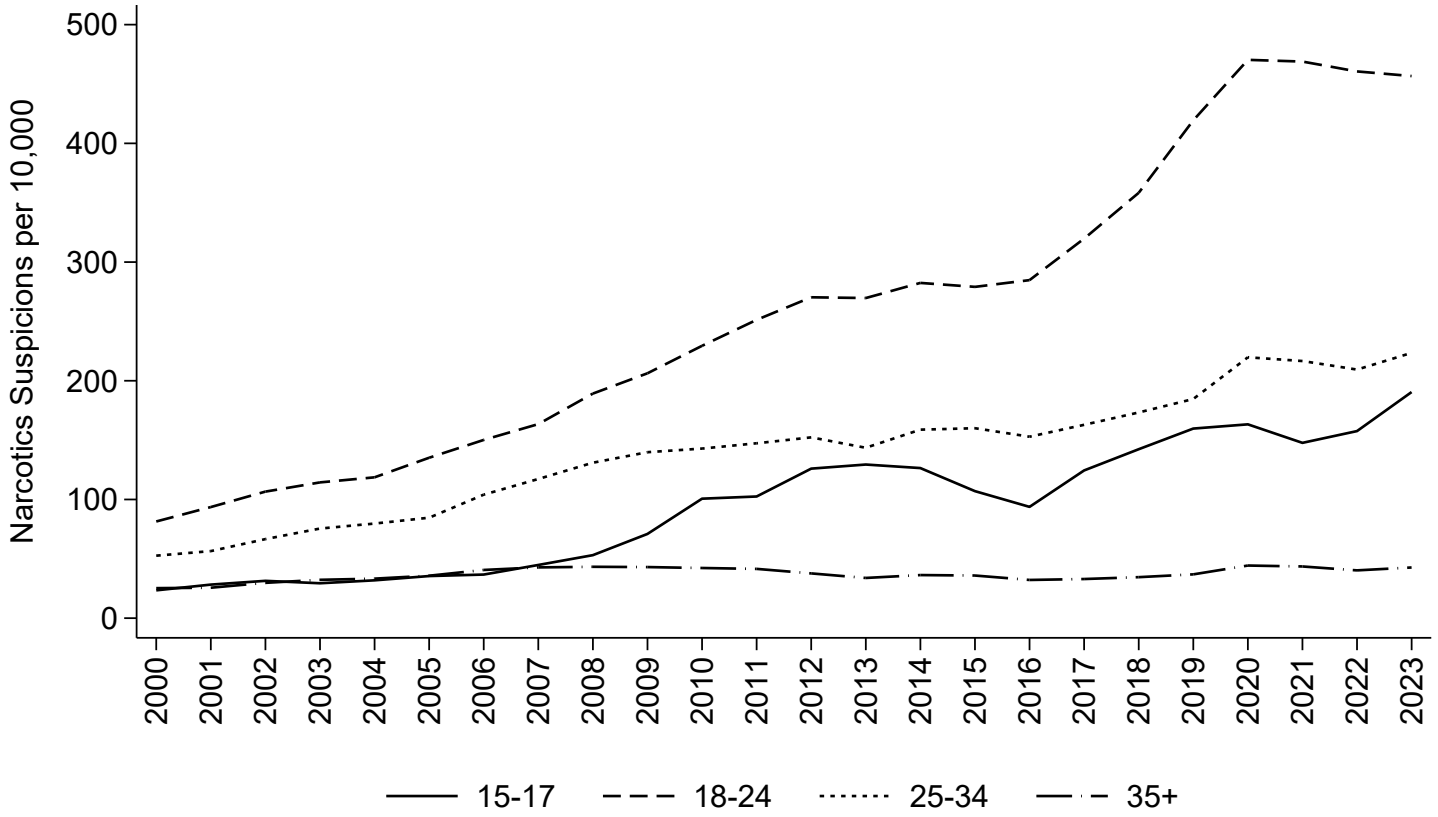


Figure A1: Narcotics Suspicions per 10,000 Individuals, by Age Intervals (2000-2023)

Note.—The figure reports number of suspicions per 10,000 individuals within each age bracket from 2000 to 2023, indicated by the x-axis. Suspicions are reported by date of registration.

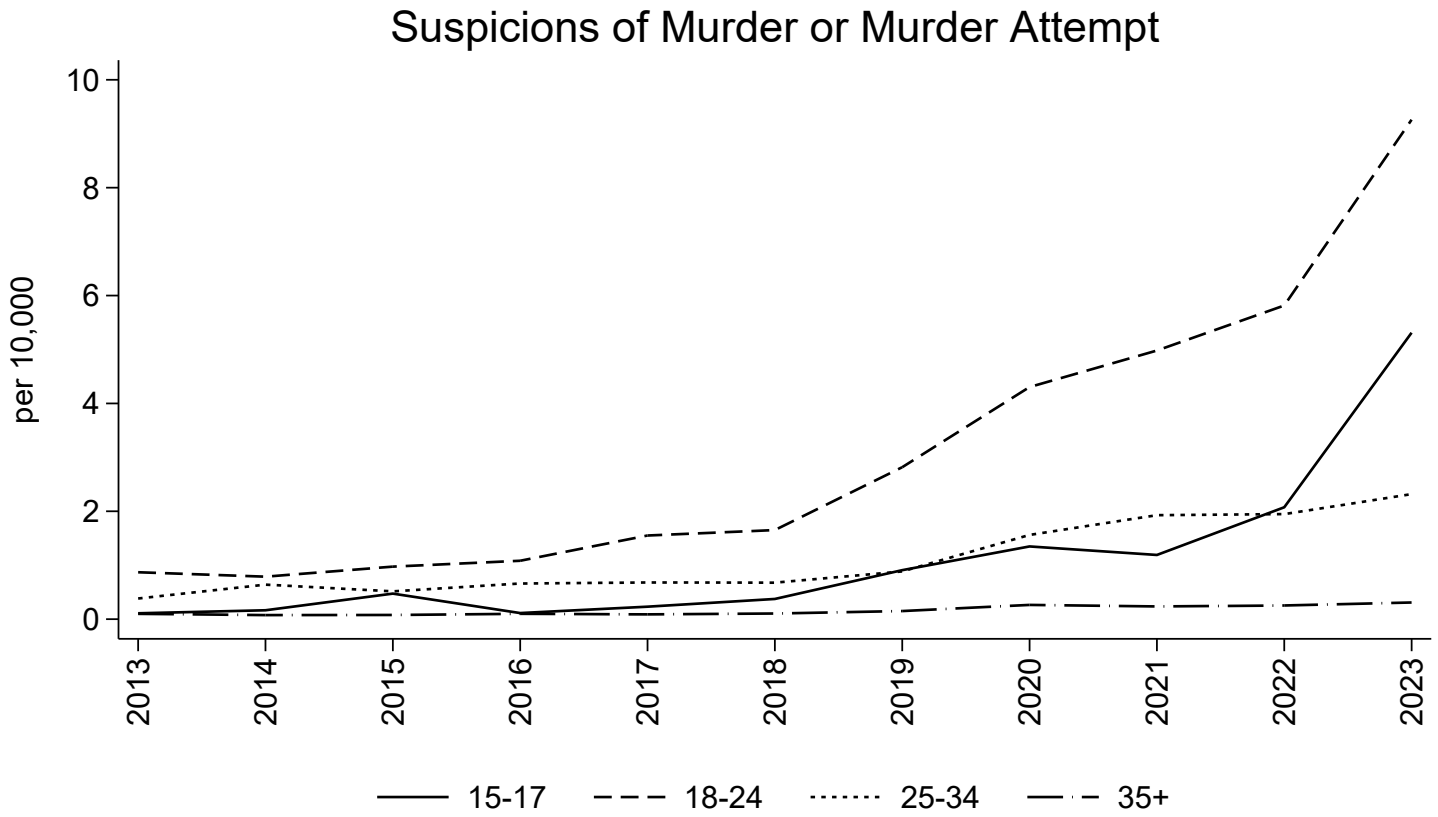


Figure A2: Murder or Attempted Murder Suspicions per 10,000 Individuals, by Age Intervals (2013-2023)

Note.—The figure reports number of murder or murder attempt suspicions per 10,000 individuals within each age bracket from 2000 to 2023, indicated by the x-axis. Suspicions are reported by date of registration.

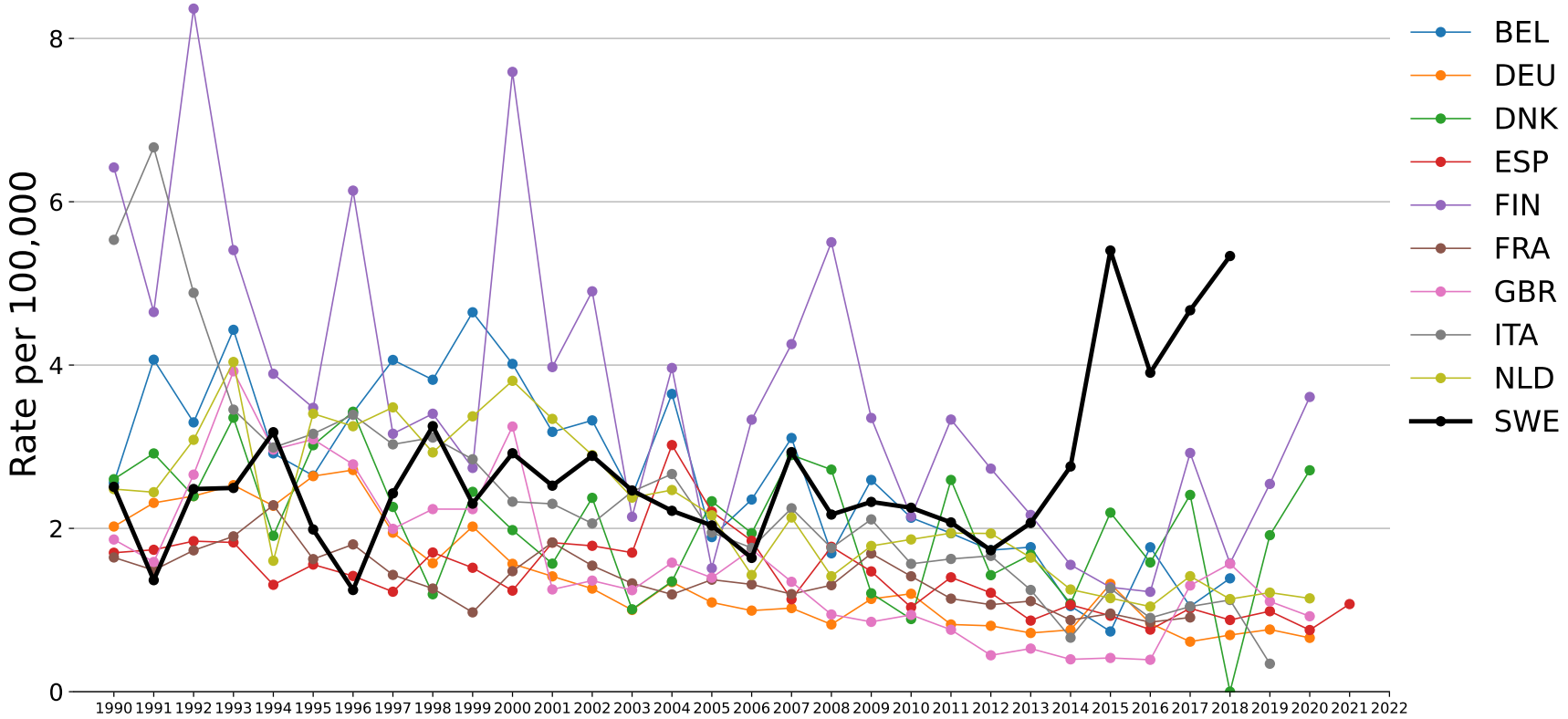


Figure A3: Mortality from Interpersonal Violence in European Countries

Note.—Figure reports deaths from interpersonal violence per 100,000 individuals across European countries.

Source: WHO, 2023, Mortality Database.

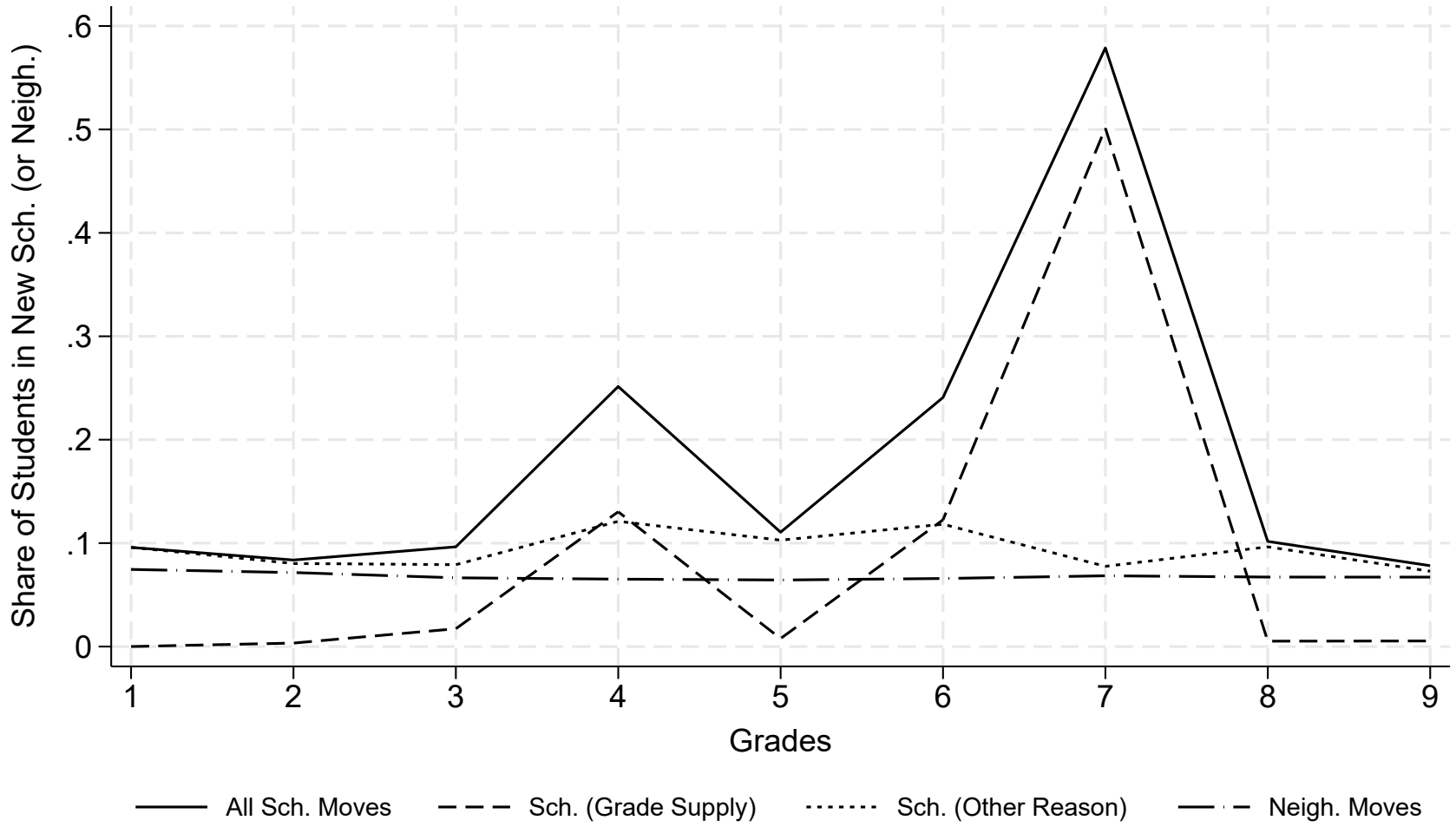
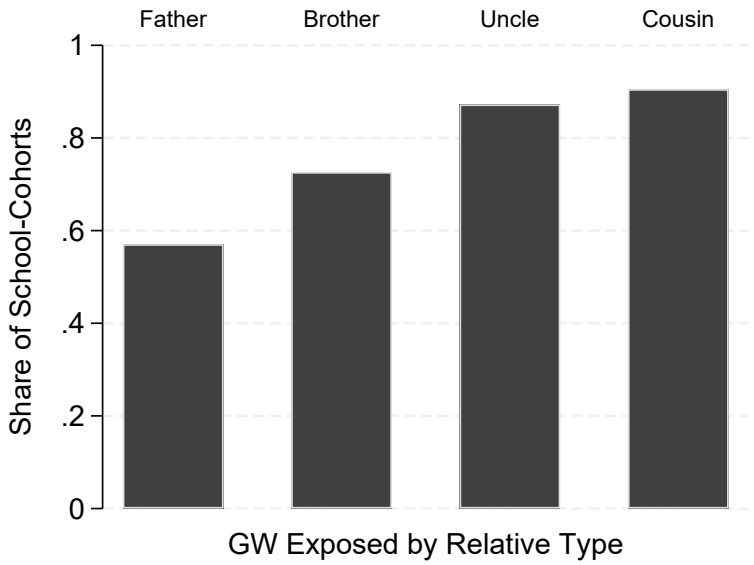


Figure A4: School and Neighborhood Mobility Across Grades (2013-2019)

Note.–Figure shows the share of students who change schools or neighborhoods across grades 1-9, pooled over the years 2013 to 2019. The y-axis indicates the share of students in a new school or neighborhood; the x-axis indicates the grade level. *All Sch. Moves* capture students who change schools for any reason. *Sch. (Grade supply)* captures moves due to the previous school not offering the next grade. *Sch. (Other reason)* captures school changes despite the availability of grades. *Neigh. Moves* show the share of students living in a new neighborhood compared to the previous grade.

(a) School-Grade Cohorts



(b) Neighborhood-Grade Cohorts

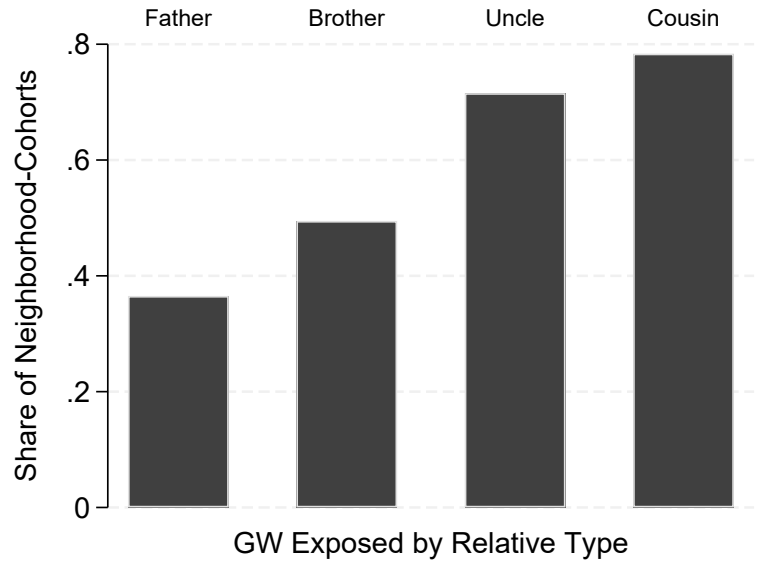


Figure A5: Extensive Variation in GW Exposure by Relative Type

Note.—The figure reports the share of cohorts exposed to at least one GW peer, separately for school-grade and neighborhood-grade cohorts and by relative type. A cohort is defined as exposed if it contains at least one peer whose corresponding relative exhibits prior gang-related offending. The figure therefore documents the extensive margin of GW exposure across peer environments.

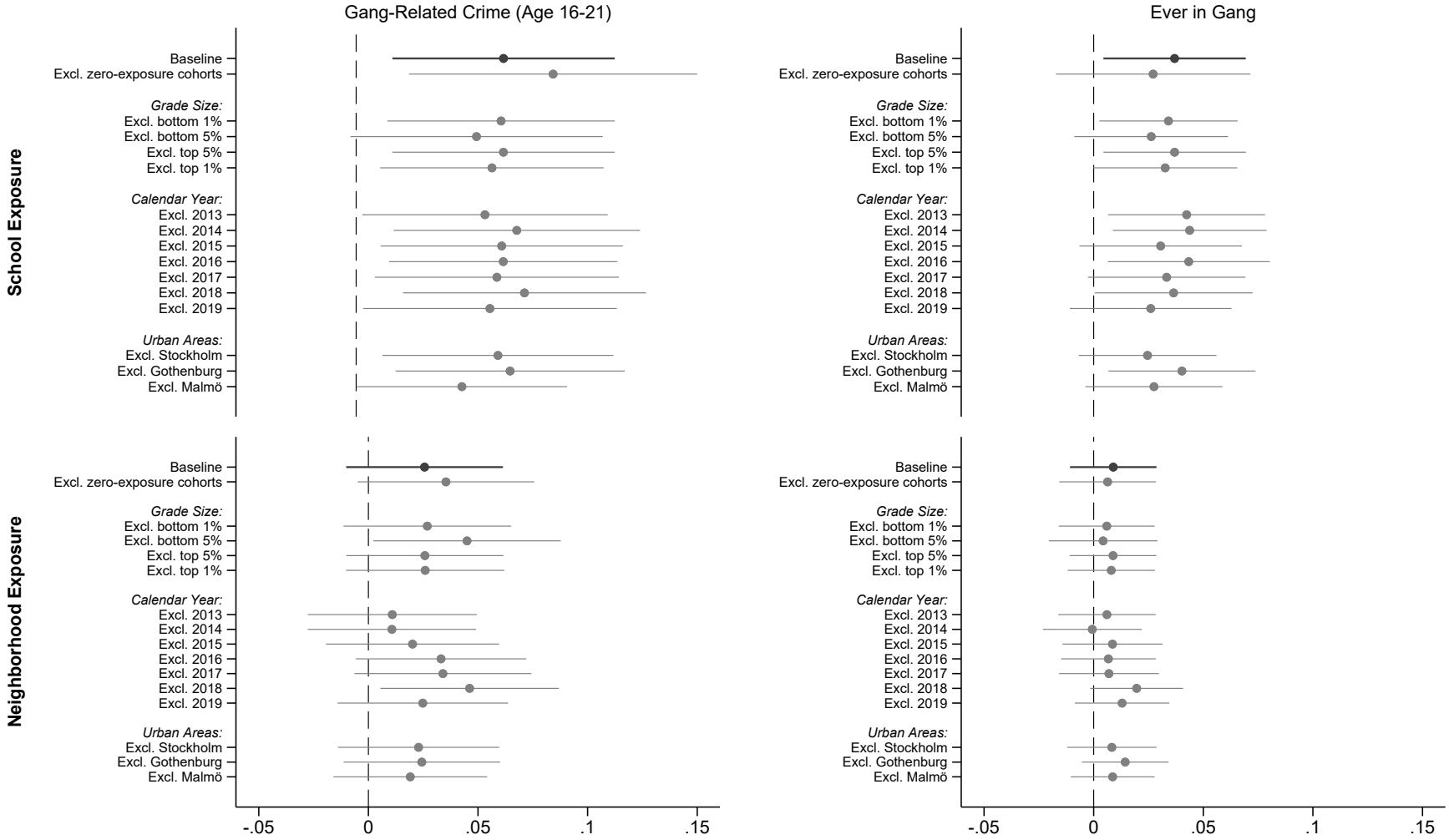


Figure A6: Robustness to Sample Restrictions

Note.—The figure reports estimated effects of GW exposure under alternative sample restrictions. Specifications exclude observations based on peer group size, calendar years, and major metropolitan areas (Stockholm, Göteborg, and Malmö). Error bars report 95% confidence intervals.

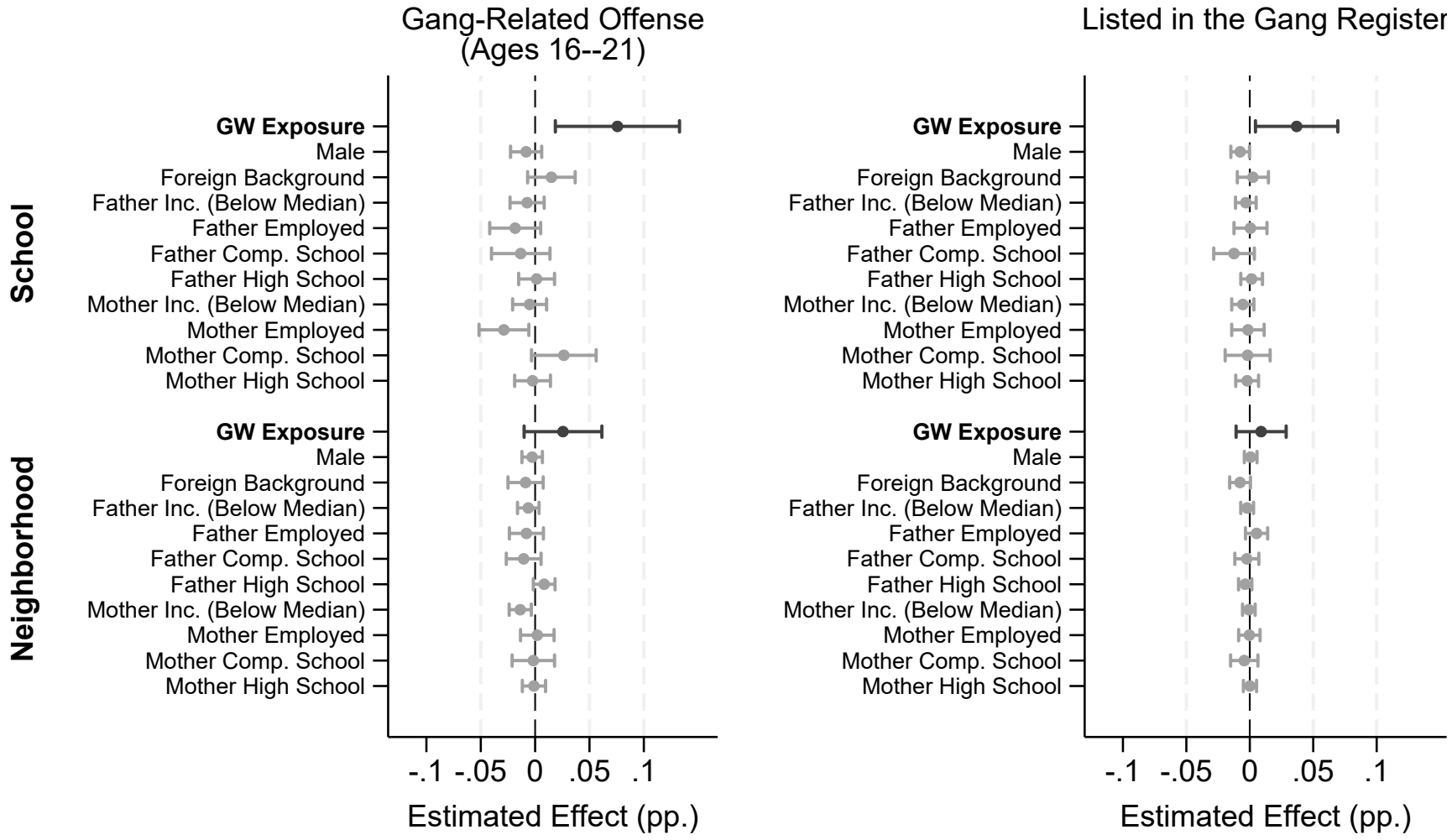


Figure A7: Alternative Peer Characteristics

Note.—The figure reports estimated effects of exposure to peer characteristics in grade 7 on subsequent criminal outcomes. Exposure is defined as the share of peers in the school-grade or neighborhood-grade group with the specified characteristic (e.g., male, foreign background, or parental characteristics). Coefficients are scaled to correspond to one additional peer with the specified characteristic in the average peer group. Error bars report 95% confidence intervals.

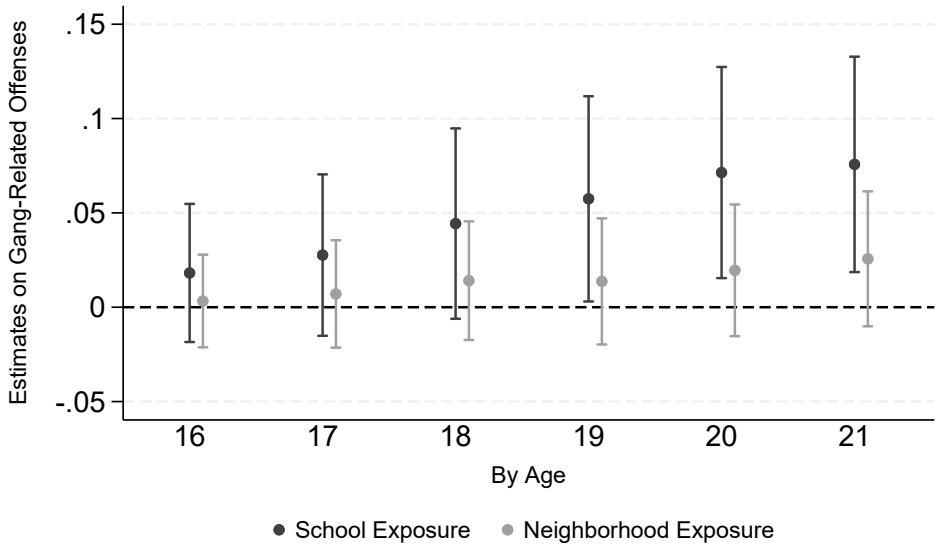


Figure A8: Effects of GW Exposure on Gang-Related Offending by Age

Note.—The figure reports estimated effects of brother-based GW exposure on cumulative gang-related offending by age. Exposure is measured in grade 7 and defined as the share of peers with older brothers who have prior gang-related offending. Estimates are shown separately for school-grade and neighborhood-grade exposure. Error bars represent 95% confidence intervals.

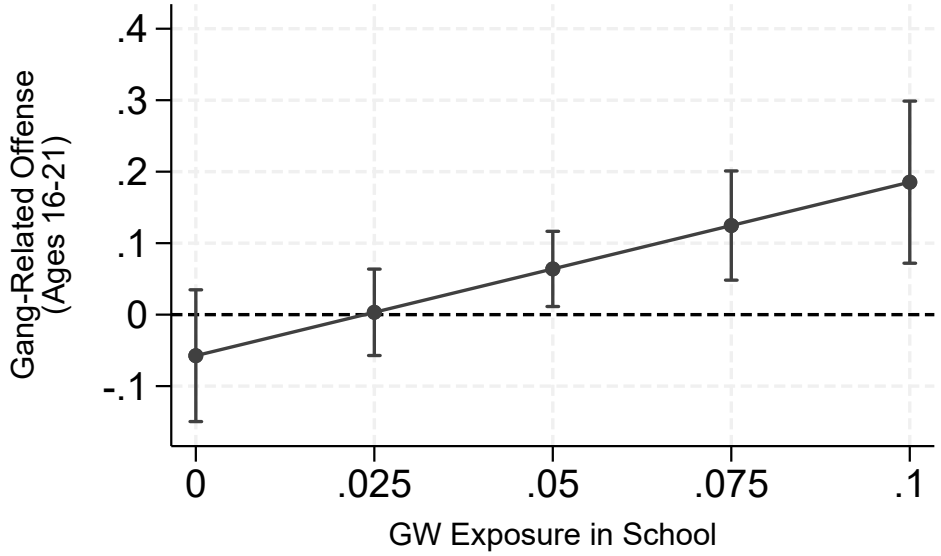


Figure A9: Nonlinear Effects of GW Exposure in School

Note.—The figure reports estimated effects of school-grade GW exposure on gang-related offending (ages 16–21) across the observed support of the treatment. Exposure is measured in grade 7 and defined as the share of peers with older brothers who have prior gang-related offending. Estimates are based on a second-order polynomial in GW exposure, with points corresponding to marginal effects evaluated at selected values between 0 and 0.1. Error bars represent 95% confidence intervals.

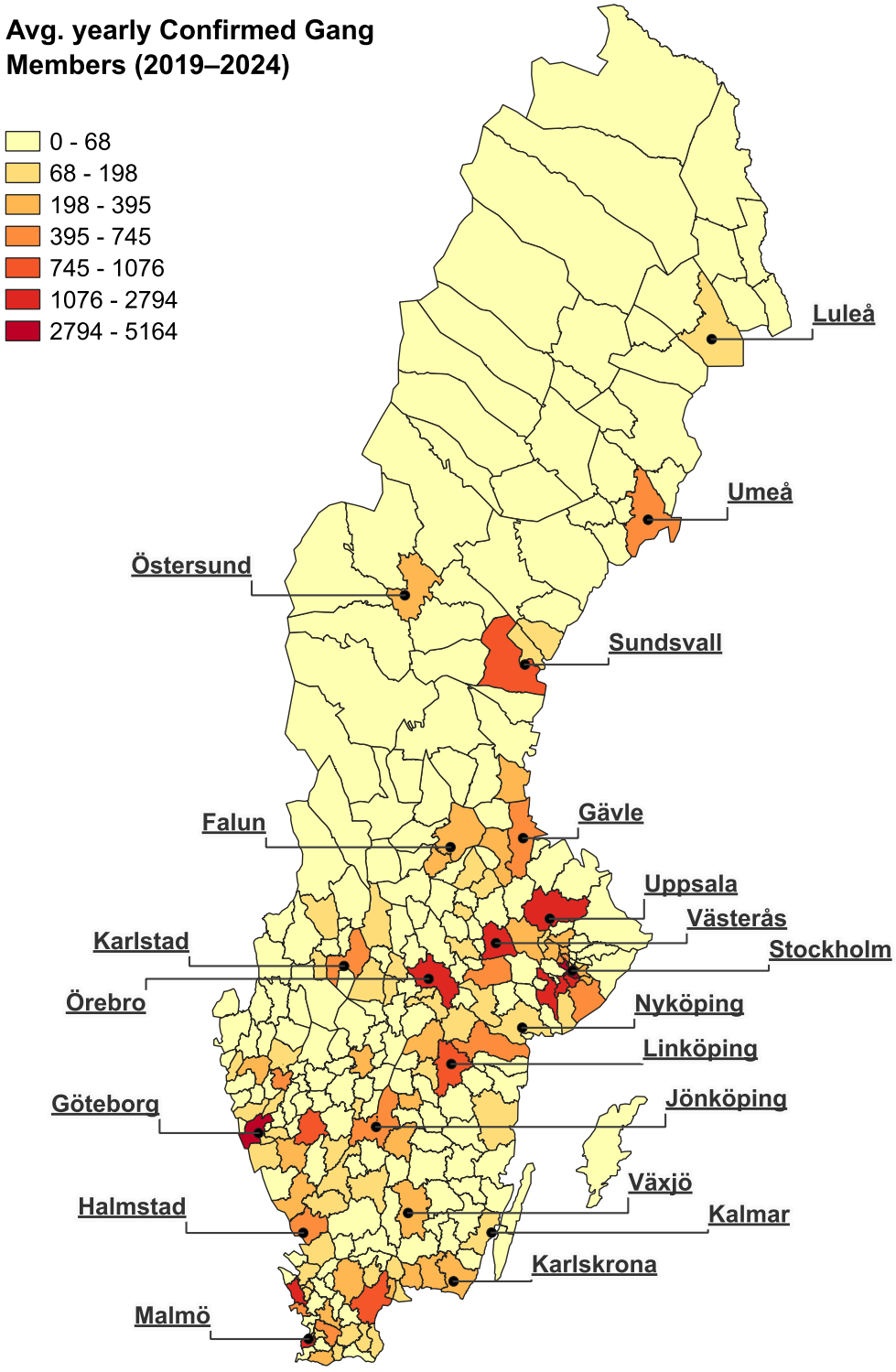


Figure A10: Geographic Distribution of Gang Members Across Municipalities

Note.—The figure shows the municipality-level distribution of the average annual number of confirmed gang members between 2019 and 2024, based on registered place of residence. Value categories are defined using Jenks natural breaks, which minimize within-class variance and maximize between-class variance.

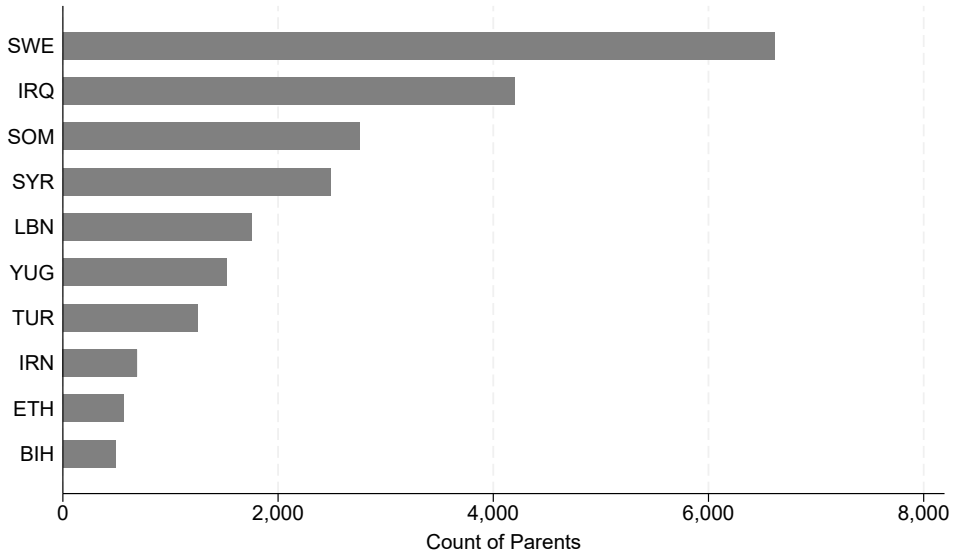


Figure A11: Parental Origin of Individuals Listed in the Gang Register

Note.—The figure reports the ten most common countries of birth of parents (mothers and fathers) of individuals listed in the Gang Register.

Appendix Tables

Table A1: Conviction and Suspicion Type Frequencies For Individuals Listed and Not-Listed in the Gang Register

Panel A: Convictions

Not Listed in the Gang Register						Listed in the Gang Register					
	Freq.	Age	Male	Foreign	Uniq. IDs		Freq.	Age	Male	Foreign	Uniq. IDs
Traffic	613,809	39.16	0.85	0.31	380,472	Narcotics	47,642	22.69	0.96	0.70	11,166
Narcotics	458,631	29.06	0.83	0.32	189,849	Traffic	22,891	24.31	0.97	0.71	7,420
Property	369,451	33.36	0.63	0.39	216,186	Property	14,012	23.41	0.95	0.70	6,152
Other	210,965	36.01	0.79	0.33	170,071	Other	11,053	23.50	0.97	0.73	6,279
Violent	99,844	33.96	0.86	0.35	78,279	Weapon	10,257	23.75	0.98	0.68	5,187
Weapon	88,843	32.26	0.89	0.29	54,319	Violent	7,447	22.66	0.97	0.71	4,687
Sex	21,307	35.55	0.99	0.42	19,671	Sex	446	22.97	1.00	0.81	425

Panel B: Suspicions

Not Listed in the Gang Register						Listed in the Gang Register					
	Freq.	Age	Male	Foreign	Uniq. IDs		Freq.	Age	Male	Foreign	Uniq. IDs
Other	1,101,235	37.16	0.77	0.37	529,912	NarcUse	69,827	21.88	0.96	0.72	13,338
TheftBurg	668,698	30.51	0.60	0.39	263,017	NarcPoss	68,592	22.13	0.96	0.72	12,143
Assault	671,627	34.30	0.76	0.43	378,305	Other	64,711	22.79	0.96	0.73	11,308
NarcUse	601,486	27.55	0.82	0.31	223,487	TheftBurg	39,808	22.38	0.95	0.72	8,687
NarcPoss	432,795	28.70	0.82	0.34	164,570	Assault	34,910	22.24	0.96	0.74	10,255
Threat	418,712	36.80	0.78	0.42	235,103	Traffic	20,076	23.80	0.97	0.70	6,935
Traffic	200,919	34.04	0.84	0.33	111,386	Threat	17,504	23.42	0.96	0.72	6,695
Fraud	192,670	34.47	0.66	0.44	104,485	Knife	13,726	23.49	0.98	0.68	5,362
Vandalism	169,726	30.58	0.83	0.29	111,707	NarcPossUse	13,566	22.98	0.97	0.72	6,227
Knife	119,985	31.34	0.90	0.32	58,876	NarcDist	13,253	22.90	0.97	0.73	6,141
PeaceBreach	107,640	36.60	0.80	0.41	82,866	Robbery	10,247	21.28	0.98	0.77	5,245
VioOfficer	88,828	31.57	0.82	0.35	61,416	Vandalism	9,860	22.65	0.97	0.69	4,996
Tax	89,246	45.44	0.81	0.38	59,531	Fraud	9,575	24.01	0.95	0.69	3,746
NarcPossUse	72,379	30.71	0.82	0.34	47,779	Gun	7,244	21.91	0.98	0.72	4,383
NarcDist	64,702	30.33	0.82	0.35	42,923	StolGoods	7,154	24.23	0.97	0.69	3,586

Note.—The table reports the frequency of convictions and suspicions by crime type, along with the average age, share of males, share with foreign background, and the number of unique individuals for not listed and those listed in the Gang Register.

Table A2: Raw and Residualized Variation in GW Exposure by Relative Type

	Mean	Std. Dev	Min	Max
Raw Brother Based GW Exposure				
School-Grade	0.028	0.027	0.000	1.000
Neighborhood-Grade	0.028	0.036	0.000	0.500
Residualized Brother Based GW Exposure				
School-Grade	0.000	0.018	-0.190	0.287
Neighborhood-Grade	0.000	0.026	-0.212	0.420
Raw Father Based GW Exposure				
School-Grade	0.016	0.018	0.000	0.500
Neighborhood-Grade	0.016	0.026	0.000	1.000
Residualized Father Based GW Exposure				
School-Grade	0.000	0.014	-0.143	0.256
Neighborhood-Grade	0.000	0.020	-0.193	0.556
Raw Uncle Based GW Exposure				
School-Grade	0.053	0.033	0.000	1.000
Neighborhood-Grade	0.052	0.045	0.000	1.000
Residualized Uncle Based GW Exposure				
School-Grade	0.000	0.023	-0.237	0.351
Neighborhood-Grade	0.000	0.035	-0.297	0.880
Raw Cousin Based GW Exposure				
School-Grade	0.066	0.036	0.000	1.000
Neighborhood-Grade	0.066	0.050	0.000	1.000
Residualized Cousin Based GW Exposure				
School-Grade	0.000	0.026	-0.190	0.811
Neighborhood-Grade	0.000	0.039	-0.333	0.762

Note.—The table reports unconditional variation in exposure to fathers, brothers, uncles, and cousins with prior gang-related offending across school-grade and neighborhood-grade peer groups. It also reports residual variation after conditioning on calendar-year and school-neighborhood fixed effects.

Table A3: Summary Statistics for Female Students in Grade 7

	(1) All Students	(2) Non-GW Students	(3) GW Students	(4) Gang Students
A. Outcomes: Post or End of Compulsory School				
Crime Activity (Age 16-21)				
Any	0.07	0.06	0.13	0.18
Gang-Related	0.01	0.01	0.03	0.04
Violent	0.02	0.01	0.04	0.07
Property	0.04	0.03	0.07	0.09
Narcotics	0.02	0.02	0.05	0.05
Weapon	0.00	0.00	0.01	0.01
Other	0.02	0.02	0.03	0.05
Listed in the Gang Register	0.00	0.00	0.00	0.02
Eligibility for Upper Secondary School	0.90	0.91	0.82	0.73
Merit Score	235.89	240.83	209.51	191.15
Standardized Test (Grade 9)	0.12	0.17	-0.15	-0.45
Mental Health Diagnoses (Age 16-21)				
Mood	0.08	0.07	0.10	0.07
Stress	0.12	0.12	0.17	0.12
B. Background				
Foreign Background	0.20	0.20	0.14	0.50
Single Parent Home	0.25	0.23	0.36	0.38
Standardized Test (Grade 6)	0.10	0.14	-0.10	-0.42
Father Characteristics				
Age	46.35	46.41	46.06	45.78
Above Median Labor Income	0.52	0.54	0.39	0.26
Employed, yr t-1	0.87	0.88	0.81	0.67
Yrs. of Schooling	12.20	12.39	11.22	10.44
Dead	0.01	0.01	0.02	0.02
Missing	0.03	0.03	0.01	0.03
Mother Characteristics				
Age	43.33	43.42	42.86	41.70
Above Median Labor Income	0.50	0.52	0.42	0.27
Employed, yr t-1	0.84	0.85	0.80	0.64
Yrs. of Schooling	12.82	12.96	12.05	10.75
Dead	0.00	0.00	0.01	0.01
Missing	0.00	0.00	0.00	0.00
C. Peer Groups				
Peers in school-grade	95.15	95.61	92.72	90.50
Peers in neighborhood-grade	49.27	49.61	47.45	50.77
Peers in neighborhood-school-grade	22.40	22.58	21.47	20.68
Observations	328,150	276,224	51,926	6,024

Note.—The table reports sample means for four groups of female students in grade 7: (1) all female students, (2) female students without any relative with prior gang-related offending, (3) female students with at least one relative with prior gang-related offending (the GW peers), and (4) female students with at least one relative listed in the gang register. Crime activity and mental health diagnoses are measured between ages 16 and 21, while school outcomes are measured at the end of compulsory school. Relatives listed in the gang register are recorded after the analysis windows.

Table A4: Summary Statistics for Gateway Peers By Relative Type

	(1) Father-Based GW Students	(2) Brother-Based GW Students	(3) Uncle-Based GW Students	(4) Cousin-Based GW Students
A. Outcomes: Post or End of Compulsory School				
Crime Activity (Age 16-21)				
Any	0.37	0.29	0.23	0.18
Gang-Related	0.15	0.11	0.08	0.05
Violent	0.15	0.12	0.08	0.05
Property	0.20	0.14	0.11	0.07
Narcotics	0.20	0.15	0.10	0.08
Weapon	0.06	0.04	0.03	0.02
Other	0.11	0.09	0.07	0.06
Listed in the Gang Register	0.03	0.04	0.02	0.01
Eligibility for Upper Secondary School	0.69	0.74	0.80	0.84
Merit Score	161.33	181.30	192.55	205.38
Standardized Test (Grade 9)	-0.59	-0.44	-0.30	-0.15
Mental Health Diagnoses (Age 16-21)				
Mood	0.09	0.07	0.07	0.07
Stress	0.16	0.11	0.12	0.12
B. Background				
Male	0.52	0.51	0.52	0.51
Foreign Background	0.12	0.37	0.14	0.06
Single Parent Home	0.58	0.44	0.36	0.32
Standardized Test (Grade 6)	-0.46	-0.43	-0.24	-0.12
Father Characteristics				
Age	41.57	50.43	43.11	47.08
Above Median Labor Income	0.10	0.27	0.37	0.44
Employed, yr t-1	0.46	0.67	0.81	0.86
Yrs. of Schooling	9.61	10.52	11.11	11.52
Dead	0.06	0.03	0.02	0.02
Missing	0.00	0.02	0.01	0.00
Mother Characteristics				
Age	38.91	45.63	40.36	44.11
Above Median Labor Income	0.25	0.31	0.39	0.47
Employed, yr t-1	0.67	0.67	0.79	0.85
Yrs. of Schooling	11.05	11.02	11.90	12.43
Dead	0.01	0.01	0.01	0.01
Missing	0.00	0.00	0.00	0.00
C. Peer Groups				
Peers in school-grade	92.11	89.94	92.46	92.81
Peers in neighborhood-grade	45.39	50.08	47.17	46.72
Peers in neighborhood-school-grade	20.14	20.45	21.63	22.28
Observations	10,925	19,365	35,820	44,908

Note.—The table reports sample means for four groups of GW peers in grade 7, defined by the relative through whom they are linked to prior gang-related offending: (1) father-based GW peers, (2) brother-based GW peers, (3) uncle-based GW peers, and (4) cousin-based GW peers. Crime activity and mental health diagnoses are measured between ages 16 and 21, while school outcomes are measured at the end of compulsory school.

Table A5: Exogeneity Test: GW Exposure Defined By Fathers

Peer Environment:	*Dep Var: GW Exposure Defined By Father Gang-Related Offending*			
	School-Grade		Neighborhood-Grade	
	(1)	(2)	(3)	(4)
Foreign Background	0.0027**	0.0002	0.0048**	-0.0002
	(0.0003)	(0.0001)	(0.0004)	(0.0002)
Single Parent HH.	0.0010**	0.0000	0.0024**	0.0000
	(0.0001)	(0.0001)	(0.0002)	(0.0001)
Father Age	-0.0000	0.0000	-0.0000*	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Father Inc. (Below Median)	0.0013**	0.0000	0.0020**	-0.0001
	(0.0001)	(0.0001)	(0.0002)	(0.0001)
Father Employed	-0.0002	0.0000	-0.0004^{+}	-0.0001
	(0.0002)	(0.0001)	(0.0002)	(0.0002)
Father Comp. School	0.0019**	0.0001	0.0018**	0.0001
	(0.0002)	(0.0001)	(0.0002)	(0.0002)
Father High School	0.0016**	-0.0000	0.0015**	-0.0000
	(0.0001)	(0.0001)	(0.0002)	(0.0001)
Father Missing	0.0014*	-0.0000	0.0001	-0.0005
	(0.0006)	(0.0004)	(0.0007)	(0.0006)
Mother Age	-0.0001**	0.0000	-0.0001**	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Mother Inc. (Below Median)	0.0009**	0.0001	0.0013**	0.0000
	(0.0001)	(0.0001)	(0.0002)	(0.0001)
Mother Employed	-0.0003*	0.0001	-0.0008**	-0.0000
	(0.0002)	(0.0001)	(0.0002)	(0.0002)
Mother Comp. School	0.0014**	-0.0000	0.0012**	0.0002
	(0.0002)	(0.0001)	(0.0003)	(0.0002)
Mother High School	0.0010**	-0.0001	0.0014**	0.0002*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Mother Missing	-0.0011	0.0004	-0.0010	0.0016^{+}
	(0.0007)	(0.0005)	(0.0010)	(0.0008)
Year Fixed		✓		✓
School-Neighborhood Fixed		✓		✓
F-Stat	26.2166	0.6466	39.2155	1.0578
p(F)	0.0000	0.8378	0.0000	0.3917
Adj. R^2	0.0206	0.4033	0.0219	0.3389
Dependent Mean	0.0164	0.0164	0.0162	0.0162
Observations	292,144	292,144	292,144	292,144

Note.—Each column reports a separate regression of GW exposure on the listed student and family characteristics. GW exposure is defined using fathers with prior gang-related offending. Columns (1) and (3) report unconditional correlations, while columns (2) and (4) include calendar-year fixed effects and restrict comparisons to students within the same school-neighborhood cells. Columns (1) and (2) measure exposure at the school-grade level, and columns (3) and (4) at the neighborhood-grade level. The reported F-statistic corresponds to the joint test of the included characteristics, including an indicator for missing household information that is not reported, with p(F) denoting the associated p-value. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, ($^{+}$) $p < .1$.

Table A6: Exogeneity Test: GW Exposure Defined By Uncles

Peer Environment:	*Dep Var: GW Exposure Defined By Uncle Gang-Related Offending*			
	School-Grade		Neighborhood-Grade	
	(1)	(2)	(3)	(4)
Foreign Background	0.0055**	0.0000	0.0088**	0.0003
	(0.0007)	(0.0002)	(0.0008)	(0.0003)
Single Parent HH.	0.0013**	-0.0001	0.0032**	-0.0002
	(0.0002)	(0.0001)	(0.0003)	(0.0002)
Father Age	-0.0000*	-0.0000	-0.0000+	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Father Inc. (Below Median)	0.0021**	-0.0001	0.0035**	0.0001
	(0.0003)	(0.0001)	(0.0003)	(0.0002)
Father Employed	0.0004	-0.0000	0.0009*	0.0002
	(0.0003)	(0.0002)	(0.0004)	(0.0003)
Father Comp. School	0.0044**	0.0003+	0.0042**	0.0001
	(0.0004)	(0.0002)	(0.0004)	(0.0003)
Father High School	0.0041**	0.0001	0.0041**	0.0000
	(0.0003)	(0.0001)	(0.0003)	(0.0002)
Father Missing	0.0016	-0.0002	0.0012	-0.0008
	(0.0010)	(0.0006)	(0.0013)	(0.0009)
Mother Age	-0.0002**	0.0000	-0.0002**	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Mother Inc. (Below Median)	0.0013**	0.0002+	0.0021**	0.0003+
	(0.0002)	(0.0001)	(0.0003)	(0.0002)
Mother Employed	0.0002	0.0003	-0.0002	0.0001
	(0.0003)	(0.0002)	(0.0004)	(0.0003)
Mother Comp. School	0.0031**	0.0000	0.0020**	-0.0005+
	(0.0004)	(0.0002)	(0.0005)	(0.0003)
Mother High School	0.0028**	0.0001	0.0030**	0.0001
	(0.0002)	(0.0001)	(0.0003)	(0.0002)
Mother Missing	-0.0041**	0.0012	-0.0063**	0.0024+
	(0.0013)	(0.0009)	(0.0019)	(0.0014)
Year Fixed		✓		✓
School-Neighborhood Fixed		✓		✓
F-Stat	23.4681	0.7883	31.6412	1.0287
p(F)	0.0000	0.6921	0.0000	0.4215
Adj. R^2	0.0237	0.4528	0.0215	0.3753
Dependent Mean	0.0530	0.0530	0.0524	0.0524
Observations	292,144	292,144	292,144	292,144

Note.—Each column reports a separate regression of GW exposure on the listed student and family characteristics. GW exposure is defined using uncles with prior gang-related offending. Columns (1) and (3) report unconditional correlations, while columns (2) and (4) include calendar-year fixed effects and restrict comparisons to students within the same school-neighborhood cells. Columns (1) and (2) measure exposure at the school-grade level, and columns (3) and (4) at the neighborhood-grade level. The reported F-statistic corresponds to the joint test of the included characteristics, including an indicator for missing household information that is not reported, with p(F) denoting the associated p-value. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

Table A7: Exogeneity Test: GW Exposure Defined By Cousins

Peer Environment:	*Dep Var: GW Exposure Defined By Cousin Gang-Related Offending*			
	School-Grade		Neighborhood-Grade	
	(1)	(2)	(3)	(4)
Foreign Background	-0.0081**	-0.0003+	-0.0099**	-0.0001
	(0.0008)	(0.0002)	(0.0009)	(0.0003)
Single Parent HH.	0.0003	0.0001	0.0006+	0.0002
	(0.0002)	(0.0001)	(0.0003)	(0.0002)
Father Age	-0.0000	0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Father Inc. (Below Median)	0.0030**	0.0000	0.0034**	-0.0002
	(0.0003)	(0.0001)	(0.0004)	(0.0002)
Father Employed	0.0011**	0.0002	0.0021**	0.0002
	(0.0003)	(0.0002)	(0.0005)	(0.0003)
Father Comp. School	0.0035**	-0.0001	0.0034**	-0.0000
	(0.0004)	(0.0002)	(0.0005)	(0.0003)
Father High School	0.0042**	0.0001	0.0046**	0.0002
	(0.0003)	(0.0001)	(0.0004)	(0.0002)
Father Missing	0.0078**	0.0012+	0.0088**	0.0003
	(0.0011)	(0.0006)	(0.0015)	(0.0010)
Mother Age	-0.0002**	0.0000	-0.0002**	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Mother Inc. (Below Median)	0.0028**	0.0001	0.0033**	0.0003
	(0.0003)	(0.0001)	(0.0003)	(0.0002)
Mother Employed	0.0009**	-0.0001	0.0017**	-0.0001
	(0.0003)	(0.0002)	(0.0004)	(0.0003)
Mother Comp. School	0.0009*	0.0001	-0.0008+	-0.0001
	(0.0004)	(0.0002)	(0.0005)	(0.0003)
Mother High School	0.0025**	0.0001	0.0025**	0.0002
	(0.0002)	(0.0001)	(0.0003)	(0.0002)
Mother Missing	-0.0033*	-0.0002	-0.0051**	0.0001
	(0.0014)	(0.0010)	(0.0019)	(0.0014)
Year Fixed		✓		✓
School-Neighborhood Fixed		✓		✓
F-Stat	28.6229	1.2014	31.1259	0.8142
p(F)	0.0000	0.2627	0.0000	0.6627
Adj. R^2	0.0174	0.4397	0.0120	0.3602
Dependent Mean	0.0662	0.0662	0.0656	0.0656
Observations	292,144	292,144	292,144	292,144

Note.—Each column reports a separate regression of GW exposure on the listed student and family characteristics. GW exposure is defined using cousins with prior gang-related offending. Columns (1) and (3) report unconditional correlations, while columns (2) and (4) include calendar-year fixed effects and restrict comparisons to students within the same school-neighborhood cells. Columns (1) and (2) measure exposure at the school-grade level, and columns (3) and (4) at the neighborhood-grade level. The reported F-statistic corresponds to the joint test of the included characteristics, including an indicator for missing household information that is not reported, with p(F) denoting the associated p-value. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$.

Table A8: Mobility Following Grade 6 GW Exposure

	School Moves All Students		School Moves Grade 7 Available		Neighborhood Moves All Students	
	(1)	(2)	(3)	(4)	(5)	(6)
School Exposure	-0.009		0.029		-0.016	
	(0.037)		(0.098)		(0.019)	
Ngh. Exposure		-0.021		-0.036		-0.015
		(0.033)		(0.066)		(0.019)
Observations	248,450	248,450	119,964	119,964	248,450	248,450
Dep. Mean	0.576	0.576	0.136	0.136	0.047	0.047

Note.—Each column reports estimates from a separate regression of grade 6 GW exposure on subsequent mobility between grades 6 and 7. The three outcomes are: changing schools between grades 6 and 7 for all students (columns 1–2), changing schools between grades 6 and 7 among students whose grade 7 was available at the same school (columns 3–4), and changing neighborhoods between grades 6 and 7 for all students (columns 5–6). Within each outcome, odd-numbered columns use school-grade GW exposure and even-numbered columns use neighborhood-grade GW exposure, both measured in grade 6. GW exposure is defined using peers whose older brothers have prior gang-related offending. Standard errors are two-way clustered at the school and neighborhood levels. $(^{**})$ $p < .01$, $(^{*})$ $p < .05$, $(^{+})$ $p < .1$.

Table A9: Decomposing GW Exposure by School and Neighborhood Peer Groups

	Gang-Related Offense (Ages 16–21)			Listed in the Gang Register		
	(1)	(2)	(3)	(4)	(5)	(6)
GW Exposure Defined by Older Brothers Prior Gang-Related Offending in:						
School Only	0.044*	0.042*	0.042*	0.021*	0.020*	0.020*
	(0.017)	(0.017)	(0.017)	(0.009)	(0.009)	(0.009)
Neighborhood Only	0.002	0.001	0.001	0.004	0.004	0.004
	(0.008)	(0.008)	(0.008)	(0.004)	(0.004)	(0.004)
School and Neighborhood	0.009	0.010	0.010	0.004	0.004	0.004
	(0.010)	(0.010)	(0.010)	(0.006)	(0.006)	(0.006)
Focal Controls		✓	✓		✓	✓
Peer Group Controls			✓			✓
Observations	271,688	271,688	271,688	271,688	271,688	271,688
Dep. Mean	0.047	0.047	0.047	0.013	0.013	0.013

Note.—Each column reports estimates from equation (3), where three exposure measures are jointly estimated by decomposing exposure into peers who share only school, only neighborhood, or both school and neighborhood within the same cohort. The sample is restricted to students with peers in each of these categories, resulting in a slightly smaller sample. GW exposure is defined as the share of peers with older brothers who have prior gang-related offending. All specifications include calendar-year and neighborhood-school fixed effects. Standard errors are two-way clustered at the school and neighborhood levels. (**) $p < .01$, (*) $p < .05$, (+) $p < .1$.