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The Stockholm life-course project: investigating offending and non-lethal severe violent victimization

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ABSTRACT

Much is known about the patterning of offending throughout life, but less about the patterning of victimization. In this study, we used data from the Stockholm Life-Course Project (SLCP), a longitudinal study that includes measures of childhood problem behaviour. We analysed offending (criminal conviction and police suspicion), inpatient hospitalization and outpatient care for violent victimization. We replicated the well-established age-crime curve amongst SLCP study members. We found that hospitalization for severe violent victimization was most likely to occur between 20 and 40 years of age. We additionally considered how childhood problem behaviour impacted overall risk and life-course patterning of offending and victimization. Childhood problem behaviour was associated with a greater risk of criminal conviction. But childhood problem behaviour showed inconsistent associations with risk for police suspicion. Childhood problem behaviour was generally associated with greater involvement in crime up to middle adulthood. Childhood problem behaviour was generally associated with a greater risk of victimization. However, we were limited in our ability to estimate the effect of childhood problem behaviour on life-course patterning of victimization due to the rarity of victimization. These results imply a need for larger studies on violent victimization and greater nuance in our understanding of childhood risks and their life-long outcomes.

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The development of successful interventions aimed at preventing offending and victimization has relied on our understanding of how crime is patterned over age. Studies throughout history and from across the world have shown a general age-based inverted-U patterning of offending in which adolescents and young adults are at the greatest risk of offending, known as the age-crime curve. Cross-sectional support of the age-crime curve has persisted over time, with scholars demonstrating that the age-crime curve is not a period- or cohort-based phenomenon (e.g. Farrington et al., 2006;

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 Supplemental data for this article can be accessed [here](#).

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Gottfredson & Hirschi, 1990; Moffitt, 1993; Sampson & Laub, 1993). Instead, offending is an age-based process that can be followed across individuals' lives. For most people, offending emerges and peaks between 15 and 19 years of age and wanes during adulthood (e.g. Farrington et al., 2006; Sampson & Laub, 1993). A small group of people, however, exhibit externalizing problem behaviour during childhood – for example, aggression and anti-social behaviours such as lying and delinquency – and persist in crime throughout adulthood (Moffitt, 1993; Thornberry, 2005). The idea that childhood problem behaviour affects later criminality is found across many life-course theories of crime. For example, according to 'static' life-course theories of crime, such as Gottfredson and Hirschi's (1990,) general theory of crime and Moffitt's (1993) dual taxonomy, underlying individual traits are responsible for antisocial behaviour from childhood through adulthood (Carlsson & Sarnecki, 2015). According to 'dynamic' theories of crime, such as Sampson and Laub's age-graded theory of informal social control and Thornberry and Krohn's (2001) interactional theory, childhood problem behaviour can (and often does) interact with criminogenic contexts to produce a persistent pattern of antisocial behaviour across life (Carlsson & Sarnecki, 2015). Subsequently, crime-prevention initiatives have sought to target children with behavioural problems and reduce aggression and antisocial behaviour (Elliott, 2013).

For victimization, the cross-sectional age-based risk is less-established than for offending. Nonetheless, victimization appears to follow a similar age-based curve in which victimization is most likely to occur before 25 years of age and declines throughout adulthood (Cater et al., 2014; Hindelang et al., 1978; Hullenaar & Ruback, 2020; Lifvin et al., 2020). A handful of studies have analysed victimization longitudinally into adulthood and found, as with offending, that cross-sectional patterns appear not to be period- or cohort-based (Menard, 2000; Turanovic et al., 2016). Because of the well-established correlation between victimization and offending, we would expect childhood problem behaviour to be associated with later victimization (Lauritsen & Laub, 2007; Lauritsen et al., 1991). Indeed, some evidence has found that childhood problem behaviour may be a risk for later life victimization (Beckley et al., 2018; Chen, 2009; Turner et al., 2010). Beyond statistical evidence, childhood problem behaviour may be associated with later life victimization due to both 'static' and 'dynamic' factors. It has been argued that externalizing behaviour is a result of both traits related to regulation of emotions such as anger and environmental contexts such as poor parent-child interaction (Hanish et al., 2004). When children express anger, aggression and frustration in their interactions with peers, they increase their risk of being victimized (Hanish et al., 2004). Victimization may subsequently result in further negative emotionality, starting a cycle, which may prove challenging break.

However, our understanding of which children are vulnerable to victimization during life and the development of early interventions to prevent victimization, has been limited by a small number of studies, which measure victimization longitudinally. Longitudinal data have been a hallmark of criminological research from Sweden and other countries with extensive administrative data. In these countries, government agencies gather and store data from the criminal justice system and hospitals, amongst other institutions. These data can be used to measure offending and victimization throughout life. But these data are limited in their ability to measure childhood problem behaviour – a measure typically not gathered by government

agencies. Instead, it is necessary to rely on unofficial sources, such as parents, teachers, or children themselves, for reporting childhood problem behaviour. Such research can be done retrospectively, where people are asked about an adult's behaviour as a child, but such an approach introduces problems with recall and survivor bias. These problems can be avoided through studies in which childhood behaviour is assessed during childhood, prior to the measurement of offending and victimization. Offending and victimization can thus be mapped throughout life via administrative data and predicted through non-administrative sources of childhood problem behaviour.

We do just that in this longitudinal study. We start with a brief review of cross-sectional and longitudinal evidence of the age-crime curve in Sweden. We then discuss the most-used Swedish longitudinal data sets that combine childhood interview data with register data. We follow this with an overview of cross-sectional age-based patterns of victimization and the relatively small amount of evidence on longitudinal patterns of victimization and childhood problem behaviour as a predictor of victimization across age. We then describe the Stockholm Life-Course Project, a Swedish sample of individuals that includes administrative data and non-administrative childhood problem behaviour data. We analyse the cross-sectional age patterns of offending and non-lethal severe violent victimization up to 80 years of age in the Stockholm Life-Course Project. We then focus on how childhood problem behaviour is associated with risks of offending and vulnerability to victimization at any point in life and across life. We conclude with our implications for theories on long-term outcomes of childhood problem behaviour, policy interventions and future research.

Age patterns of offending and associations with childhood problem behaviour in Sweden

The age-crime curve has been supported by cross-sectional and longitudinal official Swedish data.¹ Official Swedish cross-sectional data on criminal conviction have been available since at least the mid-1960s, when the Swedish Penal Code went into effect (Von Hofer, 2011). Official cross-sectional data on suspicion have been available since the mid-1990s. These data have shown that the risk of officially recorded offending declines with age (<https://www.bra.se/statistik/kriminalstatistik.html>). Swedish longitudinal studies of individuals have also shown that the risk of crime is greatest amongst younger people (Sivertsson, 2018; Sivertsson & Carlsson, 2015). These studies have shown that people roughly under 21 years of age are at the greatest risk of offending and that offending declines with age.

Whether individuals adhere to the typical age-crime curve or persist in above-average levels of offending throughout life has been examined in Swedish data, with studies showing support for the association between childhood problem behaviour and crime across life. Some studies have been based on part of the data used in the present analysis. For example, a study indicated that children with reported problem behaviour are more likely to offend up to their mid-30s (Sarnecki, 1985). Another study based on a portion of the data used presently found an association between childhood risks

(such as teacher-rated behaviour problems and delinquent peers) and both an increased risk of crime and more crime across life up to 59 years of age (Sivertsson & Carlsson, 2015).

Other research has been conducted using data from the Individual Development and Adaptation (IDA) programme (N = 1,393), a longitudinal study of human development. The IDA program comprises all children enrolled in third-grade in 1965 in the mid-sized Swedish city of Örebro. Data were collected from multiple reporters and gathered from administrative records. Findings on life-course offending from the IDA program have been summarized elsewhere (Corovic et al., 2017). Briefly, the IDA male study members generally began their official criminal careers in mid- to late-adolescence and female study members began in early adulthood. Offending and externalizing behaviours, such as aggression and motor restlessness, reported before 15 years of age were associated with official offending from ages 15 to 30 years. Additionally, teacher-rated externalizing problems (e.g. aggressiveness, concentration difficulties and motor restlessness) were associated with a risk of violent offending up to 35 years of age (Andershed et al., 2016).

Additional research has been conducted using the Stockholm Birth Cohort (SBC; N = 15,117), a longitudinal study facilitating research in psychology, public health and sociology. The SBC comprises individuals born in Stockholm in 1953 and living in the Stockholm metropolitan area in 1963. Data were collected from multiple reporters and gathered from administrative records, with police-registered offending gathered as early as 13 years of age. By age 26 years, approximately one-fifth of SBC members had a police record and repeated offending was common (Wikström, 1990). A study on SBC members at 30 years of age (94% of the initial sample) showed that teacher-rated conduct problems (assessed ages 12–13 years and 15–16 years) and referral to child welfare services for behavioural problems were associated with police-recorded crime by age 30 years (Kratzer & Hodgins, 1997). Another follow-up at 48 years of age (84% of original sample) showed that SBC members suspected of crime both before and after 19 years of age were most likely to have been sent out of their childhood school classroom for behaviour problems (Nilsson & Estrada, 2009). Additional research using age-48 follow-up data found that officially registered crime and drug abuse before 19 years of age was associated with continuance of those outcomes between ages 19 and 30 (Bäckman & Nilsson, 2011).

Collectively, these results demonstrate, in Swedish samples, associations between childhood problem behaviour and criminal offending into early- and mid-adulthood. Few studies, Swedish or otherwise, have been able to assess the association between childhood problem behaviour and criminal offending into middle adulthood. Almost certainly, this limitation has been due to the extensive planning and effort needed to conduct childhood interviews and obtain follow-up data (Beckley et al., 2021).

Age patterns of victimization and associations with childhood problem behaviour

In general, we know significantly less about victimization across life than we do about offending. We know from cross-sectional studies that victimization generally follows a curve similar to offending in that younger people are more likely to be victimized. Reports from the United States' National Crime Victimization Survey (NCVS), a nationally representative survey of US households, has shown that the 'age-victimization curve'

follows a pattern similar to the age-crime curve. In Europe, one study analysed country-specific age-victimization patterns amongst a sampling of countries that participated in the International Crime Victims Survey (ICVS) 2005 – a survey of crime victimization ranging from theft to assault (Ródenas & Doval, 2020). Results showed that as individuals aged, the prevalence of victimization decreased.

In Sweden, victimization research has largely been based on self-report data. The largest study, conducted by the National Council of Crime Prevention since 2006, is the annual Swedish Crime Survey (Nationella trygghetsundersökningen). Victimization has also been assessed in the, now bi-annual, National Public Health Survey (Nationella folkhälsoenkäten) since 2007 and in the annual Swedish Living Conditions Survey (ULF/SILC) since 1978. All surveys include Swedish residents from 16 to 84 years of age. The survey response rates have ranged from low to acceptable: 40% in the NTU 2020 (Lifvin et al., 2020), ca. 60% in the National Public Health Survey (Stickley & Carlson, 2010) and 80% in the ULF/SILC (Nilsson & Estrada, 2006). All these surveys, despite different sample sizes and differently worded questions, show that young people are at the greatest risk of physical violence and that the risk generally declines with age (Lifvin et al., 2020; Nilsson & Estrada, 2006; Stickley & Carlson, 2010). These national survey data indicate that, of adolescents aged 16–19 years, roughly 10–13% are victims of violence (Lifvin et al., 2020; Stickley & Carlson, 2010).²

Few longitudinal studies of individuals have demonstrated patterns of victimization beyond childhood and adolescence and typically, the patterning of victimization is not the focus.³ A handful of studies examine repeated victimization across life (Menard, 2012; Tillyer, 2014; Turanovic et al., 2016; Wittebrood & Nieuwbeerta, 2000). These studies show that early victimization is a risk for later victimization. The studies additionally show that the risk of victimization declines with age. However, these studies fail to demonstrate basic patterns of victimization across age. One indication that age-victimization patterns may approximate age-crime patterns was shown in a study of a US-based sample followed from adolescence to adulthood (Menard, 2000). This study found that as individuals aged, the frequency of violent victimization (having been threatened, assaulted or robbed) declined for most, but remained high amongst a few. Moreover, about half of the sample had experienced a violent victimization on more than one occasion throughout the study period.

Studies have connected childhood problem behaviour to later victimization, but generally not across adult life. Evidence extending from childhood into adolescence, based on representative samples from the United Kingdom and the United States of less than 2,000 individuals each, has shown that childhood problem behaviour predicts adolescent victimization (Beckley et al., 2018; Turner et al., 2010). Another study of a sample of adolescents under correctional supervision found that early problem behaviour was not associated with repeated victimization into adulthood (Turanovic et al., 2016). However, this result might have been due to simultaneous controls for negative behaviours (like drinking and drug use), which are also correlated with early problem behaviour. One Swedish study of retrospective reports from 748 girls and boys collected upon admission to outpatient alcohol and drug abuse clinics for adolescents found that around half of the sample had been physically victimized. The physically victimized adolescents, relative to the non-victimized adolescents, were more likely to have reported having substance abuse problems and difficulties in controlling aggression prior to victimization (Anderberg & Dahlberg, 2016).

Present study

Swedish evidence has shown a cross-sectional age-crime curve in which the risk of offending peaks during mid- to late adolescence and declines throughout adulthood. For offending, it has been well established through longitudinal studies of individuals that this pattern is an age-based process. Additionally, a handful of Swedish studies have shown that childhood problem behaviour may be a reliable predictor of who persists in crime throughout life. Swedish and some global evidence shows that victimization follows an age-crime curve similar to offending. But, there is little evidence from Sweden or elsewhere demonstrating how victimization is patterned across individual lives. This allows for the possibility that cross-sectional victimization patterns are evidence of period or cohort effects. Moreover, evidence linking childhood problem behaviour to victimization is sparse. This study aims to fill these gaps by analysing a longitudinal data set of crime and victimization. This study first aims to describe cross-sectional age patterns of offending and victimization. It then aims to determine whether childhood problem behaviours predict the risk of offending and victimization. Here, two hypotheses are tested:

H1: Early childhood problem behaviour is associated with an increased risk of offending across life.

H2: Early childhood problem behaviour is associated with an increased risk of victimization across life.

This study finally aims to describe the association between childhood problem behaviour and life-course patterning of offending and victimization.

Method

Data

To analyse offending and victimization throughout life, we used the Stockholm Life-course Project (SLCP, $N = 15,390$). The SLCP is a longitudinal study focused on delinquency and offending. The SLCP was formed on the basis of four studies, which were then followed-up with register data to help build the SLCP data. In the process of building the SLCP data, register data could not be located (usually due to death or incorrect id number) for a small percentage ($< 4\%$) of members of the four initial studies. The four initial studies were the Skå Study, the Stockholm Boys Study, the Clientele Study and the Section 12 Youth Group (SiS) Study.

Skå study members ($n = 100$ in the initial study) were young men, aged 7 to 15 years (born 1941–1953), who were placed between January 1955 and August 1961 in the residential Skå facility in Stockholm due to antisocial behaviour. Of the 100 original members in the Skå study, 97 (97%) were included in the SLCP data.

Stockholm Boys study members ($n = 222$ in the initial study) were drawn from annual birth cohorts between 1939 and 1946 using stratified random sampling (with birth cohorts representing the strata). Of those initially selected to participate, 16 boys (6.7%)

did not participate due to parent refusal or moving outside of Sweden prior to the study's initiation. The SLCP does not contain data on childhood problem behaviour amongst the Stockholm Boys Study members. All the members of the Stockholm Boys study were included in the SLCP data.

The Clientele Study ($n = 287$ in the initial study) comprised two groups of boys. The 'delinquent' group ($n = 192$) was established through randomly drawn Stockholm police reports of crime committed between January 1959 and June 1963 by boys aged 14 years and younger (born 1943 to 1951). Of those initially selected to participate in the delinquent group, eight boys (4.2%) dropped out of the study. The Clientele Study 'control' group ($n = 95$) consisted of young men who did not appear in the Stockholm Police reports and who matched roughly every other member of the delinquent group on demographic factors of age, parent socioeconomic status and family type. Of those initially selected to participate in the control group, five boys (5%) dropped out of the study. Of the original 287 members in the Clientele Study, 282 (98.3%; 187 (97.4%) delinquent, 95 (100%) control) were included in the SLCP data.

The SiS Study ($n = 423$ in the initial study) comprised two groups. The 'placed' group ($n = 270$; 71% male) were young women and men, aged 16 to 21 years (born 1969–1974), who were placed in residential treatment homes in Stockholm between 1990 and 1994 due to antisocial behaviour and followed for two years as part of the SiS Study. The SiS 'unplaced' group ($n = 153$, 71% male) consisted of youths aged under 21 years of age (born 1969–1974), who were considered for placement in a residential treatment home, but were unable to be placed in the treatment home due to lack of capacity. Of the original 423 members in the SiS Study, 420 (99.3%; 267 (98.9%) placed, 163 (100%) unplaced) were included in the SLCP data.

The SLCP data, in 2011, were created by using Swedish personal identity numbers (which were later anonymized) of members from the four initial studies to draw data from the Swedish population and multi-generation registers. Members of the Skå, Stockholm boys, Clientele and SiS studies were linked to their parents, children, grandchildren, siblings and siblings' children, resulting in the study population for the SLCP. Many other registers were linked to the SLCP study population to form the complete SLCP data (see the Supplemental Material for details).

Data on offending in the SLCP come from the Conviction Register and the Police Suspicion Register. The Conviction Register (also known as the Prosecution Register or Swedish Crime Register) contains information on court convictions from January 1973 onwards.⁴ It is estimated that 1% of Swedish convictions were overturned on appeal (Frisell 2012). Roughly half of convictions are criminal injunctions (*strafföreläggande*) executed by the prosecution following admission of guilt. Guilty convictions comprise all convictions regardless of the reason (e.g. insanity) or the sentencing outcome (e.g. sentences to forensic psychiatric treatment). Also, plea bargaining is not allowed in Sweden. Conviction data were available through mid-2010.

The Police Suspicion Register contains information on suspicion of crime by the police from January 1995 onwards. Official suspicion by the police can occur when police have sufficient evidence to link an individual to a crime. An individual may or may not be taken into custody. It is well established that official suspicion by police does not always lead to prosecution (Sarnecki & Carlsson, 2020). Thus, police suspicion is more prevalent than conviction. Suspicion data were available through 2009.⁵

Data on violent victimization in the SLCP come from the National Patient Register. The Swedish National Board of Health and Welfare has been collecting data on inpatient hospitalization in public hospitals since the 1960s.⁶ Since 1972, all public inpatient hospitalization in Stockholm and Uppsala has been included. Since 1987, all public inpatient hospitalization in Sweden has been included. Inpatient hospitalization typically requires an overnight hospital stay. Inpatient hospitalization occurs when a patient's condition cannot be safely managed outside of a hospital. Since 2001, data on outpatient care have also been included in the National Patient Register. Outpatient care in the National Patient Register generally concerns hospital visits in which the patient enters and exits the hospital on the same day. In such cases, the patient's condition can be safely managed outside of a hospital. Inpatient hospitalization for violent victimization may represent more severe victimization than outpatient care for violent victimization. For both inpatient hospitalizations and outpatient care for violent victimization, ICD codes were used to indicate the type of diagnosis. For this study, ICD codes for violent victimization (injury inflicted by others) were as follows: ICD-8 and ICD-9: E960-E969; ICD-10: X85-X99, Y00-Y09. These codes captured violent assaults (including sexual assaults) with and without the use of a weapon. Victimization data were available through 2009.

This study also incorporated the Migration and Cause of Death register to establish whether SLCP study members were at risk of offending or being victimized. Study members who did not appear in these registers were assumed to be at risk of offending and victimization.

The SLCP data are anonymized and the study was approved by the regional ethical board in Stockholm and is in accordance with the 1964 Declaration of Helsinki and its later amendments.

In this study, our methods consisted primarily of descriptive analyses of the risk of recorded crime and victimization by age. We first analysed all members of the SLCP for which there were non-erroneous death and migration data ($n = 15,197$). We sought to replicate established age patterns of risk across life amongst all members of the SLCP. To assess the predictive value of childhood problem behaviour, we focused on the prevalence of offending and victimization amongst members of the four initial studies. We used a case-control design to test whether early problem behaviour had an impact on the risk of offending across life. The Skå study members, with known childhood problem behaviour, were compared with the randomly selected, similarly aged Stockholm Boys study members.⁷ The Clientele delinquent group members were compared with the demographically matched Clientele control group members. Finally, the SiS-placed group members were compared with the SiS-unplaced group members. In the SiS comparison, although the placed group would be considered the 'case group', we expected that the placed and unplaced members would have similar risks of offending and victimization since they both had demonstrated antisocial behaviour. We finally analysed patterns of recorded crime and victimization across the lives of members in each of the four initial studies to determine long-term effects of childhood problem behaviour.

Results

Members of the SLCP came from over 100 annual birth cohorts and contributed 500,601 annual observations. Earlier and later birth cohorts were majority female, whereas the middle cohorts were majority male, corresponding to the all-male sampling frames of the Skå, Stockholm boys and Clientele studies. The method of sampling family generations from initial study members is also evident by the four peaks in Figure 1. Roughly, the first peak represents parents of Skå, Stockholm boys and Clientele study members. The second peak represents Skå, Stockholm boys and Clientele study members, their siblings and parents of SiS study members. The third peak represents children, nieces and nephews of Skå, Stockholm boys and Clientele study members as well as SiS study members and their siblings. The fourth peak represents grandchildren, grandnieces and grandnephews of Skå, Stockholm boys and Clientele study members as well as children and nieces and nephews of SiS study members.

We first demonstrated age patterns of crime amongst members of the SLCP. For these analyses, we grouped all SLCP study members by their age. Figure 2(a) shows the percent of offenders by age amongst SLCP study men and women. The percent convicted was based on study members aged 15 years and older between 1973 and mid-2010. The percent suspected was based on study members aged 15 years and older between 1995 and 2009. The patterning was consistent with the expectation of an age-crime curve, with women at a far lower risk than men throughout life. However, unlike most studies of official criminal offending, the peak age of offending came slightly later. We expected the

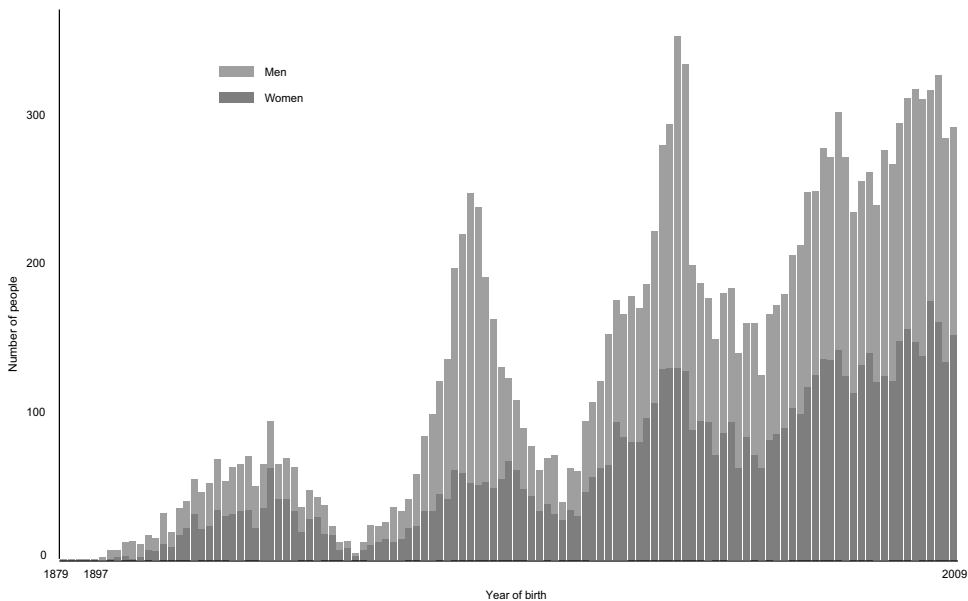


Figure 1. Members of the SLCP with non-erroneous death and migration data ($N = 15,197$) by year of birth. Members of this analysis came from over 100 annual birth cohorts and contributed 500,601 annual observations.

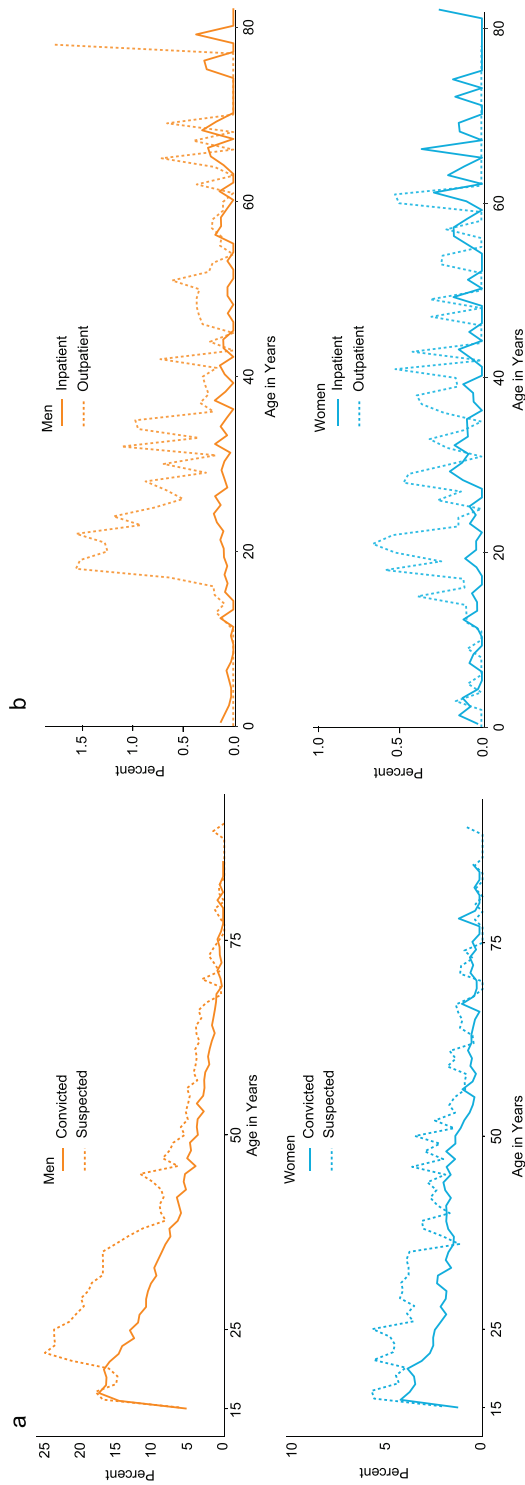


Figure 2. Offending and victimization amongst members of the SLCP. a) Percent in SLCP with registered offending (the age of criminal responsibility is 15 years). The prevalence of offending followed established age patterns of offending, with women at a far lower risk than men throughout life. b) Percent in the SLCP hospitalized for violent victimization. Inpatient hospitalization for violent victimization was most likely amongst older study members. Outpatient care for violent victimization was most likely between the ages of 20 to 40 years.

Table 1. Offending and victimization amongst the four interview study members. Three comparisons were made.^a The Skå study members with known childhood problem behaviour were compared with the randomly selected Stockholm boys study members. The clientele delinquent group was compared with the demographically matched Clientele control group. The SIS-placed group was compared with the SIS-unplaced group.

	Skå	Stockholm boys	Clientele delinquent	Clientele control	SIS-placed	SIS-unplaced
Birth year range	1941–1953	1939–1946	1943–1951	1943–1951	1969–1974	1969–1974
Reported childhood problem behaviour	Yes – placed outside of home due to serious delinquency	Unknown – random sample from population	Yes – registered as involved in serious crime by the Stockholm police	No – not in register of crime held by Stockholm police	Yes – children subsequently placed outside of home	Yes – children not placed outside of home
Percent convicted (N convicted/N observed)	77.4 (72/93)	28.0 (61/218)	62.2 (115/185)	44.1 (41/93)	93.5 (246/263)	92.1 (139/151)
Percent suspected (N suspected/N observed)	58.1% (43/74)	15% (30/200)	32.7% (52/159)	$p = .004$ 21.3% (19/89)	86.9% (226/260)	$p = .569$ 76.5% (114/149)
Percent of inpatient hospitalization for victimization (N victimized/N observed)	2.3 (2/88)	0.9 (2/212)	1.1 (2/182)	$p = .057$ 0 (93)	6.1 (16/263)	$p = .007$ 2.6 (4/151)
Percent of outpatient hospitalization for victimization (N victimized/N observed)	4.3 (3/69)	0 (0/190)	3.3 (5/150)	$p = .311$ 0 (0/88)	10.4% (25/241)	$p = .116$ 7.0% (10/142)
				$p = .001$		$p = .276$

^aStatistical tests to compare groups were proportion difference tests (also referred to as z-tests).

age-crime curve to emerge given the long history of repeated cross-sectional statistics indicating an age-crime pattern. Yet, the clarity of the age-crime curve is remarkable considering that these data combine many different cohorts and periods of observation.

Figure 2(b) shows the percent of hospitalizations for violent victimization by age amongst SLCP study men and women. The percent with an inpatient hospitalization for violent victimization was based on study members observed from 1972 to 2009. The percent with outpatient care for violent victimization was based on study members observed from 2001 to 2009. The patterning was inconsistent with the expectation of an age-victimization curve. Inpatient hospitalization for violent victimization was most likely amongst older study members. Outpatient care for violent victimization was most likely between the ages of 20 and 40 years. It should be noted that, for outpatient care for victimization, the number of study members observed at older ages waned. Study members aged 60 years and older accounted for less than 10% of all observations able to receive outpatient care for victimization. Overall, age-victimization patterns found in our data might have been due to period or cohort effects made apparent by the relative infrequency of victimization.

We next sought to understand how childhood problem behaviour was associated with the risk of offending and victimization. We analysed the overall risk of offending and victimization amongst members of the four initial studies using a case-control design. Here, we expected that people with reported childhood problem behaviour, relative to those without reported childhood problem behaviour, would be at a greater risk of offending and victimization.

Results showed that study members with childhood problem behaviour, relative to those without childhood problem behaviour, were at a greater risk of conviction, consistent with our expectations (Table 1). Members of the Skå study, relative to members of the Stockholm boys study, were over twice as likely to be convicted. Members of the Clientele delinquent group, relative to members of the Clientele control group, were about 40% more likely to be convicted. Members of the SiS-placed and SiS-unplaced groups, both of which had reported childhood problem behaviour, had a similar chance of being convicted.

Results for suspicion generally showed that study members with childhood problem behaviour, relative to those without childhood problem behaviour, were at greater risk of suspicion for crime, consistent with our expectations. The results for the Skå-Stockholm boys and Clientele delinquent-Clientele control comparisons were consistent with our expectations in that risk was greatest amongst the group with known childhood problem behaviour. The difference in the Clientele comparison was slightly short of the threshold for statistical significance. The SiS-placed group members, relative to the SiS-unplaced group members, were more likely to be suspected of crime. This was inconsistent with our expectations as both groups had childhood problem behaviour.

Results for inpatient hospitalization for violent victimization showed no statistically significant differences between case and control groups due to few hospitalizations amongst the relatively small samples. However, the results for the Skå-Stockholm boys comparison and Clientele delinquent-Clientele control comparison were consistent with our expectations in that risk for inpatient hospitalization for violent victimization was greatest amongst the group with known childhood problem behaviour. Inconsistent with

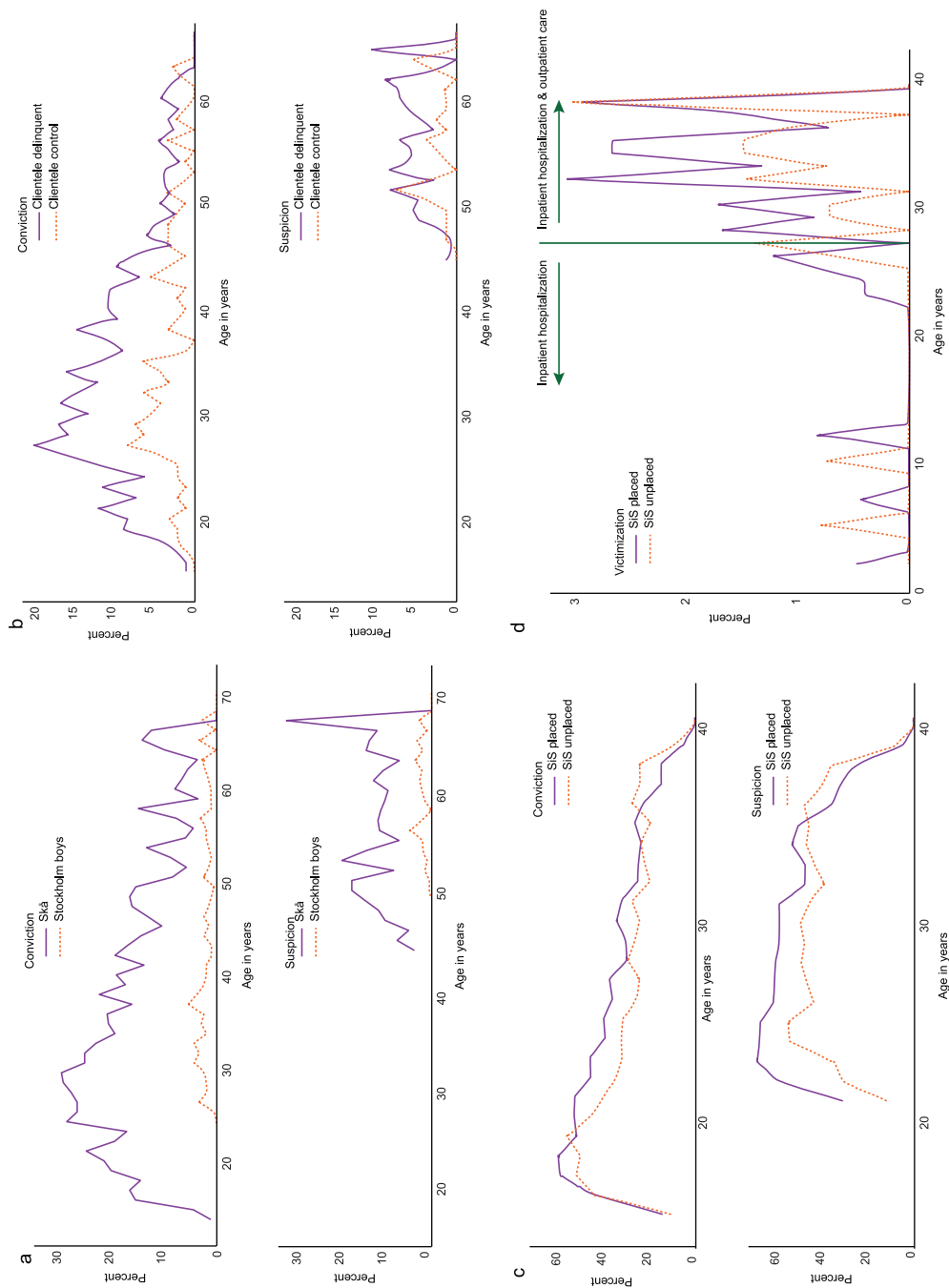


Figure 3. Offending and victimization across the lives of members of the four interview study groups. Suspicion data were available from 1995 onwards, when all study members were adults. Ages at which data are missing indicate a) offending amongst Skå and Stockholm boys members, b) offending amongst Clientele delinquent and Clientele control members, c) offending amongst SIS-placed and SIS-unplaced members and d) victimization amongst SIS-placed and SIS-unplaced members.

our expectations, the SiS-placed group members, relative to the SiS-unplaced group members, were more likely to have had an inpatient hospitalization for violent victimization, though not significantly so.

Results for outpatient care for victimization were consistent with our expectations. Members of the Skå and Clientele delinquent studies, relative to members of the Stockholm boys and Clientele control studies, respectively, were more likely to have received outpatient care for victimization. Members of the SiS-placed and SiS-unplaced groups had a similar chance of outpatient care for victimization.

Overall, the results on risk of offending and victimization at any period following childhood up were mixed. Our final step was to understand the long-term patterning of offending and victimization and whether childhood problem behaviour was predictive of different age-crime and age-victimization curves.

Figure 3(a-d) show patterns of offending, using available data, across life for members of the initial studies. Figure 3(a) shows that Skå study members were relatively active in crime throughout life, with a greater percentage of cases experiencing conviction relative to all SLCP study members Figure 2(a). The Skå study members also demonstrated the classic age-crime curve where prevalence of offending was greater earlier in life.

Figure 3(b) shows that both groups of the Clientele study demonstrated the classic age-crime curve. Clientele delinquent group members, relative to Clientele control group members, were more likely to be convicted of a crime up to about 50 years of age. Beyond 50 years of age, differences in conviction between the two groups diminished. Suspicion was more prevalent amongst the Clientele delinquent group, relative to the Clientele control group, after age 50 years.

Figure 3(c) shows very little difference in the patterning of offending between SiS-placed and SiS-unplaced groups. Both groups follow an age-crime curve, but have high rates of conviction across life, relative to the pattern amongst all SLCP study members, as shown in Figure 2(a). Suspicion generally does not follow the classic age-crime curve. It remains high throughout most of early adulthood for both groups. Suspicion before age 30 years was more prevalent amongst the SiS-placed group, relative to the SiS-unplaced group, but these differences were attenuated after 30 years of age.

Figure 3(d) shows the patterning of victimization for SiS study members. The patterning of victimization across life was similar between the placed and unplaced group. There were occasional inpatient hospitalizations for violent victimization before age 25 years. It is important to note that some of the inpatient hospitalizations for violent victimization occurred prior to the attempt to place study members in residential treatment. After age 25 years, the addition of outpatient care data resulted in a greater prevalence of victimization, which was similar between the placed and unplaced group. An age-victimization curve is, for the most part, indiscernible given that the uptick in victimization was due to inclusion of additional data sources.

Victimization was rare amongst the Skå, Stockholm boys and Clientele study members and the results were not graphed; we provide a written summary. Amongst Skå study members, there were five incidents of inpatient hospitalization for violent victimization and three incidents of outpatient care for violent victimization (see Table 1). These incidents occurred between 40 and 65 years of age. Amongst the Stockholm boys, there were two incidents of hospitalization for inpatient victimization (see Table 1), which occurred before 45 years of age. Amongst the Clientele delinquent group, there were two incidents of

inpatient hospitalization for violent victimization and five incidents of outpatient care for violent victimization (see [Table 1](#)). These incidents occurred between 35 and 65 years of age. None of the members of the Clientele control group were victimized.

Discussion

The age-crime curve has been well established through cross-sectional and individual longitudinal studies, whereas the age-victimization curve has generally been intuited from cross-sectional data. Similarly, childhood problem behaviour is a well-established risk for offending across life, but less is known about its association with victimization across the life course. This study investigated offending and severe violent victimization in a longitudinal sample of Swedish residents. The analysis of the entire SLCP supported the classic age-crime curve for both criminal conviction and suspicion of crime by the police. Results for severe violent victimization, however, did not support an age-victimization curve with a peak during adolescence. Instead, the peak of severe violent victimization occurred between 20 and 40 years of age and declined thereafter. It is possible that severe violent victimization peaks during early adulthood in Sweden, somewhat consistent results from the United States showing that severe violent victimization peaks during late adolescence and early adulthood (Morgan & Truman, 2020). We next tested two hypotheses: (1) early childhood problem behaviour is associated with an increased risk of offending across life and (2) early childhood problem behaviour is associated with an increased risk of victimization across life. The first hypothesis was generally supported. We found that early childhood problem behaviour was generally associated with a greater risk of both conviction and suspicion throughout life. The exception to this result was that SiS-placed children, relative to SiS-unplaced children, were significantly more likely to be suspected of crime by the police (as a reminder, we expected there to be no significant difference between SiS groups as both groups had reported childhood problem behaviour). Moreover, offending was shown to be generally more prevalent across life amongst people with childhood problem behaviour. Interestingly, offending amongst study members with childhood problem behaviour began to approximate offending amongst study members without childhood problem behaviour by late adulthood.

We were, in general, unable to formally support the second hypothesis that childhood problem was associated with an increased risk of violent victimization throughout life. The small number of victimizations in general made it difficult to detect statistically significant differences in inpatient hospitalization for violent victimization. For outpatient care for violent victimization, the results were as we expected: children with problem behaviour were significantly more likely to have received outpatient care for victimization. Outpatient care for violent victimization may indicate less severe victimization than inpatient hospitalization for violent victimization in terms of injury (physical or mental). However, admission decisions are not solely based upon the extent of injury.

The findings for offending based on early childhood have two important takeaways. First, early childhood problem behaviour may not be better at predicting later-life offending when controlling for childhood demographic factors. This is gleaned from the contrast in the prevalence and patterning of offending between the Skå-Stockholm boys compared to the Clientele groups. In the Clientele comparison, differences in offending between the two groups decrease over time. Delinquent and control Clientele study

members were matched on childhood demographic factors. These childhood demographic factors may have a more persistent effect on offending across the life-course rather than early childhood problem behaviour. Indeed, one study found that correlates of childhood demographic factors (e.g. parent criminal conviction and harsh parental discipline) were better predictors of life-course persistent offending, up to 61 years of age, than childhood problem behaviour (Farrington, 2020). There is also evidence of lower survivorship to later adulthood amongst people with more extensive criminal records (Laub & Vaillant, 2000; Piquero et al., 2011). As medical advances improve longevity and prove more successful at preserving life during life-threatening emergencies, we may anticipate that childhood problem behaviour yields starker contrasts in offending during later life.

Finally, it is possible that the waning association between childhood problem behaviour and crime across life is due to this study's reliance on official data. Perhaps those who are more involved in offending throughout life are likely to learn how to avoid detection by the criminal justice system. However, interview data from the later lives of some of the SLCP study members indicate that they desist in offending, not that they persist and avoid detection (Carlsson, 2013a, 2013b). The finding that desisters become similar to low-/non-offenders has also been supported by other longitudinal research (Farrington et al., 2006). This study's results should be replicated in a larger sample so that we can better understand how childhood problem behaviour and childhood sociodemographic factors are associated with offending across the entire life course.

The second takeaway is that a dichotomous indicator of childhood problem behaviour may be inadequate for understanding contact with the criminal justice system. This is gleaned from the results of the SiS Study members, which were inconsistent with our expectations and contrasted with results from other comparisons. SiS study members who were placed, relative to the unplaced, were more likely to be suspected of crime by the police, but no more likely to be convicted of crime. It is possible that placement in out-of-home care may be important for understanding being suspected of crime by the police. Future research may wish to use more nuanced measures of childhood problem behaviour when investigating contact with the police. However, it is also possible that placement in the SiS home led to labelling. The labelling of young offenders has been argued to be integral to perpetuating crime into adulthood (Moffitt, 1993; Sampson & Laub, 1993). It is possible that placed SiS study members were known to police and more likely to be either wrongly suspected of crime or suspected without sufficient evidence. Such instances would account for higher rates of suspicion, but not prosecution and conviction. Ironically then, the attempt to prevent adverse life outcomes through residential treatment could actually promote them. It is important to further investigate the consequences of SiS placement to understand whether placement in residential facilities is actually backfiring.

Although childhood problem behaviour showed some associations with victimization, the findings on severe victimization were limited. Determining patterning of victimization was difficult due to few incidents of violent victimization in our data. Nonetheless, the prevalence of victimization in the SLCP seems similar to population-level measures of inpatient victimization amongst males aged 18 and 24 years between 1992 and 2005 (Trygged et al., 2020).⁸ Certainly, the low prevalence of severe violent victimization in the population means that early childhood problem behaviour cannot play a large role in

predicting severe violent victimization during adulthood. That is, far more children exhibit early childhood problem behaviour than become victims of severe violence during adulthood. It would thus seem that whilst early childhood problem behaviour may pose a risk for severe violent victimization, other childhood predictors (such as childhood victimization) may be more reliable (see, e.g. Desai et al., 2002).

Overall, the victimization results indicate that large samples are needed to study the patterning of hospitalization for severe violent victimization across age. Severe violent victimization is certainly not representative of all victimization (Cater et al., 2014). Therefore, one may argue that these types of victimizations are not worth studying. However, victimization warranting medical care is, arguably, only second to homicide in terms of its severity. There is evidence that individuals have lower trust and lower perceived security following violent victimization (Janssen et al., 2021). Additionally, physical violence has been reported to affect the mental health of Swedish adolescents (Aho, Proczkowska-Björklund et al., 2016b; Anderberg & Dahlberg, 2016). In terms of economic costs, severe violent victimization is linked to healthcare costs and, potentially, use of sick leave or increased duration of unemployment benefits. Thus, whilst hospitalization for severe violent victimization may be rare, the consequences are grave and its prevention should be a priority. Previous research has supported the idea that childhood problem behaviour is associated with less severe forms of victimization (e.g. Hanish et al., 2004). Understanding risks for severe violent victimization and its patterning throughout life can aid in developing age-appropriate preventative measures.

Beyond the results on victimization, this study has other limitations. First, this study is primarily descriptive in its nature, limiting our ability to draw inferences on patterns of victimization and offending across life. Second, only 5% of the SLCP study members were born outside of Sweden. In contrast, the percent of foreign-born people in the Swedish population has been greater than 5% since the 1970s (Statistics Sweden, 2021). The results of this study may thus not be generalizable to contemporary cohorts. Third, the initial study members were primarily male. This has been a persistent limitation in studies of crime across the life course (Kruttschnitt, 2013). Some Swedish research indicates that few women are persistent offenders and that they initiate crime later than men (Bergman & Andershed, 2009). Additionally, the significance of the first couple of offences for life-course patterns of offending may differ between men and women (Sivertsson, 2016). Other research indicates that women, relative to men, may be more strongly affected by childhood conditions (Estrada & Nilsson, 2012). More research is needed on crime across the life course of women.

Given that the typical life-course offending pattern has now been observed across the SLCP and that childhood problem behaviour is generally indicative of offending, many other studies on crime can be pursued. For example, Swedish research has shown that childhood adversities, such as parental separation and parental mental health problems, may interact with early problem behaviour to predict some of the highest rate offending across life (Bäckman & Nilsson, 2011; Bergman & Andershed, 2009). It is possible to attempt to replicate these findings in the SLCP and expand upon them through the SLCP's combination of interview and registered data. Life-course victimization may be difficult to assess through the SLCP. However, the general risk of violent victimization – especially outpatient care for violent victimization – would be a worthwhile endeavour to pursue in the SLCP data. Other possibilities include the use of SLCP data to examine the

co-occurrence of victimization and offending. In conclusion, childhood problem behaviour appears to generally remain an important predictor of negative sequelae. However, more research should be done on the nuances of childhood problem behaviour and specific offending and victimization outcomes.

Notes

1. Swedish studies of self-reported crime have typically been school-based studies of a fixed grade level, which are regularly repeated (e.g. Svensson & Oberwittler, 2021). These studies cannot be used to provide information on the age-crime curve as they capture a short window of life and sample new people at each repetition.
2. The proportion of adolescents estimated to be victims of violence amongst surveys using the Juvenile Victimization Questionnaire (JVQ) is greater, relative to Swedish National surveys (Finkelhor et al., 2013; Fisher et al., 2015). The JVQ covers a wide variety of offences typically not covered in large surveys. In a Swedish study of a representative sample of roughly 6,000 upper-secondary students, up to 40% of the participants had experienced physical assault using the JVQ as an instrument (Aho, Gren-Landell et al., 2016a).
3. Some longitudinal studies spanning into early adulthood have examined trajectories of all types of victimization amongst the National Longitudinal Study of Adolescent to Adult Health, a US representative sample (Semenza et al., 2021; Testa et al., 2021; Turanovic, 2019). Many longitudinal studies ranging into young adulthood, however, have been targeted at a specific type of victimization (e.g. intimate partner violence in Murphy, 2011; Swartout et al., 2012) or a specific population (e.g. LGBT individuals in Mustanski et al., 2016; childhood sexual abuse victims in Papalia et al., 2017).
4. Archival data spanning back to childhood were also obtained for the Clientel study members and the Skå study members.
5. A reviewer helpfully observed that, as study members aged, it appeared that they were less likely to have suspicions resulting in prosecution. This observation appears consistent with Swedish research (Brottsförebyggande rådet, 2020). It is possible that younger people, relative to older people, are more likely to proceed through the prosecution process (Lindén, 2021).
6. One of the two emergency-department hospitals in Stockholm's inner city is private; however, private hospitals received less than 8% of funding for hospital care in 2002 (Burgermeister, 2004).
7. There is an imperfect overlap in birth cohorts between the Skå study members and the Stockholm Boys study members. We estimate that any period-related effects would have little impact on the mean values presented in this study.
8. The relatively high rates of victimization observed amongst SiS study members may indicate the need to implement victimization prevention programmes in residential treatment settings.

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