

Exploring common risk factors associated with shootings with

lethal outcomes in street gang milieus in Sweden.

Candidate: POL2237

Andreas Lekare

Fitzwilliam College

Supervisor: Dr Brandon Langley

Submitted in part fulfilment of the requirements for the Master's Degree in Applied

Criminology and Police Management

January 2024

RESEARCH ABSTRACT

Student: Andreas Lekare Supervisor: Dr Brandon Langley

1. Thesis Title

"Exploring common risk factors associated with shootings with lethal outcomes in street gang milieus in Sweden."

2. Background

Public shootings, as well as firearm-related fatalities, have increased in Sweden in the last few years. While not all shootings have lethal consequences, fatalities climbed to an unprecedented level in 2022. Recent academic work has afforded insight into certain dimensions of shootings, such as *when* and *where* they occur; less is known about the offenders who commit them. However, the places where many shootings transpire, or, *Vulnerable Neighbourhoods*, have fuelled the notion that they stem from conflicts in street gang milieus.

The Swedish Police have nationally and structurally assessed the social vulnerability in all local police districts for several years. The process sets out to identify and classify neighbourhoods where police have less legitimacy and the local community is less likely to cooperate with the police, leaving room for the emergence of organised crime and street gangs. These areas are defined as *Vulnerable Neighbourhoods*. One component of this process, commonly referred to as the *Cylinder Method*, involves identifying the individuals who contribute to this state. However, this process is not evidence-based and is largely influenced by professional judgment. The procedure results in a list on which targeting can be conducted.

There is an urgent need to increase the knowledge regarding who the lethal shooters are so interventions can be designed and applied to reduce these crimes that now have taken a firm grip on Sweden. This research aims to contribute towards improved knowledge of suspects of lethal shootings (SLS) who also are *Cylinder nominees* (CN) as identified with the *Cylinder Method* and arguably could constitute members of street gangs.

3. Research Design and Questions

This thesis adopts an exploratory retrospective case-control design. The first research question will use SLS as the unit of analysis, while the second and third will use CN. The thesis poses three research questions underpinned by six sub-questions.

Research Question 1:

To what extent have the persons identified as causing local distress with the Cylinder Method also been identified as suspects of shootings with lethal outcomes?

Research Question 2:

What is the distribution of demographic characteristics among the persons identified with the Cylinder Method who were suspected of shootings with lethal outcomes to those who were not? Sub-question 1: What are the central tendencies of age when a shooting occurs? Sub-question 2: What is the distribution of sex?

Sub-question 3: What is the distribution of individuals born abroad?

Research Question 3:

What is the distribution of offending and victimisation among the persons identified with the Cylinder Method who were suspected of shootings with lethal outcomes to those who were not? Sub-question 4: What are the central tendencies of the onset of victimisation? Sub-question 5: What are the central tendencies of the onset of offending? Sub-question 6: Does any crime or combination of crimes, as committed or victimised, have a higher estimated risk of being followed by a shooting with a lethal outcome?

4. Methods and Data

The thesis aims to identify, capture, and assemble a unique dataset. All SLS between 2018-2022 will be collected and cross-referenced with all individuals who ever have been CN. Comparisons will be identified and randomly selected among CN that are not SLS using a "criminal career code" that is generated with the *Cylinder Method*. It is generated every time a CN has been nationally assessed. Four types of data will be gathered: *crime codes, dates, gender* and *country of birth*. The research questions will be answered by analysing the data using calculations of proportions, central tendencies (mean, standard deviation, median and range), Odds Ratios, and their confidence intervals. The plan for data collection and analysis is described in Table 1.

RESEARCH QUESTION	SUB- QUESTION	DATA	ANALYSES
1		1. All SLS 2. All CN	Proportions
2	1	CN Date of birth	Proportions
	2	CN Gender	Proportions
	3	CN Country of birth	Proportions
3	4	CN accounts of victimisation	Mean Standard deviation Median Range
	5	CN accounts of offending	Mean Standard deviation Median Range
	6	1. CN accounts of victimisation 2. CN accounts of offending	Odds Ratios Confidence Intervals

Table 1: Plan for data gathering and analyses

5. Key Findings

The thesis primarily has two main findings relating to future targeting potential. Firstly, targeting cannot be based on demographic characteristics as the two CN cohorts, the SLS and

non-SLS, are nearly identical. Secondly, better targeting is possible by scanning 11 crime codes in the CN history of offending. Almost all these crime codes could be combined, supporting a more refined approach to assessing future risk than the singular unique crime codes.

6. Implications

To the author's knowledge this research constitutes the first evaluation of CN who also are SLS. As such, the findings present a unique insight into several aspects of the escalating lethal shootings. It provides the first knowledge relating to who the suspects of lethal shooters are and how many have been identified as CN using the Cylinder Method. The findings also present an interesting comparison of how the onset of victimisation and offending differ between the two cohorts. Finally, it delivers much-needed clarity that targeting to reduce shootings cannot be based on demographic characteristics but must instead build on a select set of experiences of prior offending. This actualises the usefulness of evidence-based and data-driven targeting. The same level of detail regarding prior experiences of criminality was seldom found in the reviewed literature. The findings actualise the need to analyse criminality with as much level of precision as possible. The reviewed literature often stated that violent offending is associated with an increased risk of gang membership and homicide offending. This does not align with the thesis findings as only 0.5 per cent of all accounts of violent offendings were associated with an increased risk of a subsequent lethal shooting. The findings must, however, be viewed considering their many limitations. For example, in terms of the cohort featured within this study, there is a high level of arbitrariness relating to both registrations of suspicion and nomination as a CN. The data is also analysed close to the crime occurrences, meaning that it could be extracted from open cases where accounts of victimisations and offendings could change as investigations develop. This introduces the need to view the findings with caution and also actualises the need for further research.

ACKNOWLEDGEMENTS

First and foremost, I would like to thank my dearly departed mother, who taught me to work hard; she would be very proud of this achievement. Also, thank you, Teodor, my dear husband, for supporting and facilitating this journey. Gratitude is due to my Supervisors, Sir Denis O'Connor, whose honest feedback set me on a path with a relevant subject during year one and Dr Brandon Langley, whose generous feedback helped improve the thesis sevenfold. Thank you, Anna-Lena Beutgen, who showed me the door to Cambridge and May-Britt Rinaldo Ronnebro, who let me open it. I have also received immense help and support from Fredrik Marklund, Johan Kardell, Kim Nilvall, Björn Wegner, Mia-Maria Magnusson and my sponsor Christian Malzoff.

Lastly, I would like to dedicate this work to my two daughters, Ottilie and Adele, for whom the sun rises and sets.

TABLE OF CONTENTS

RESEARCH ABSTRACT	2
ACKNOWLEDGEMENTS	6
LIST OF FIGURES	9
LIST OF TABLES	9
CHAPTER ONE: INTRODUCTION	10
1.2 The Aim of this Thesis	
1.3 Research Questions	14
1.3 Thesis structure	15
1.4 Summary	15
CHAPTER TWO: LITERATURE REVIEW	
2.1 Introduction	
2.2. The predictability of gang membership	
2.3 European gang members	20
2.4 Swedish gang members	22
2.5 The predictability of homicide offending	25
2.6 European homicide offenders	
2.7 Swedish homicide offenders	
2.8 Gang members who commit homicide	31
2.9 Summary	32
CHAPTER THREE: METHOD	
3.1 Introduction	33
3.2 Operational Setting	33
3.3 Study design	35
3.4 Summary	44
CHAPTER FOUR: FINDINGS	45
4.1 Introduction	45
4.2 The proportion of SLS who also are CN	45
4.3 The demographic characteristics of the SLS	45
4.4. The central tendencies of the onset of victimisation and offending	46
4.5 Crimes with a higher risk of being followed by suspicion of a lethal shooting	
4.5 Summary	54

CHAPTER FIVE: DISCUSSION	
5.1 Introduction	
5.2 Theoretical implication	
5.3 Policy implications	
5.4 Research implications	61
5.5 Limitations	
5.6 Summary	
CHAPTER SIX: CONCLUSION	69
REFERENCE LIST	72
APPENDICES	
Appendix A: Key-word chains used for literature searches	
Appendix B: Offender characteristics	
Appendix C: Population sizes	
Appendix D: Formulas used for analyses	
Appendix E: Detailed tables for forest plots	

LIST OF FIGURES

Figure 1: Forest plot of singular crimes	. 48
Figure 2: Forest plot of pairs of crime codes	. 50
Figure 3: Forest plot of triads of crime codes	. 52
Figure 4: Forest plot of quartets of crime codes	. 53
Figure 5: Formula used to calculate OR	. 85
Figure 6: Formula used to calculate the standard error of log odds, SE{ln(OR)}	. 85
Figure 7: Formula used to calculate the lower and upper CI	. 85

LIST OF TABLES

Table 1: Plan for data gathering and analyses	4
Table 2: Population characteristics	37
Table 3: Total number of extracted offendings and victimisations per cohort	39
Table 4: Analysed number of extracted offendings and victimisations per cohort	41
Table 5: The demographic characteristics of the SLS	46
Table 6: Central tendencies of onset of offending and victimisation	46
Table 7: The distribution of crimes or combinations which OR does not cross the 1.0 line	49
Table 8: Example of a Key-word chain	81
Table 9: Characteristics of gang members	82
Table 10: Demographic characteristics of HO	83
Table 11: Number of potential matches within each criminal career group	84
Table 12: Values for crime codes and their full names	86
Table 13: Values for crime code pairs	87
Table 14: Values for crime code triads	88
Table 15: Values for crime code quartets	89

CHAPTER ONE: INTRODUCTION

The number of shootings, regardless of the outcome, has steadily increased in the Kingdom of Sweden (Sweden) over the last few years (Polisen, 2018; BRÅ, 2019; BRÅ, 2021a). 2022 saw the highest number of shootings, 391, since the Swedish Police Authority (Police) started recording data on shootings in 2017. This constitutes a 12 per cent increase since 2021 (Polisen, 2023). All shootings are not intended to injure or kill (Polisen, 2017); some are intended as threats, for example, aimed at houses where an adversary lives, or tests of a firearm's functionality (BRÅ, 2016). However, the increased number of shootings has had alarming consequences; the number of victims has increased by 27.4 per cent from 2021 to 2022 (Polisen, 2023). Paradoxically, the number of victims suffering physical injury because of a shooting has decreased by 6.9 per cent in the same time frame (Polisen, 2023). However, data on hospital emergency admissions for firearm-related injuries, which predates police data, provide another interesting perspective: admissions increased by 200 per cent from 2001 to 2022 (Mondani & Rostami, 2023). Shootings have adversely affected Sweden with the associated escalating losses of human life and the resulting increased costs to the police (GP, 2014; SR, 2023) as well as the public sector (Hultman & Vikberg, 2020; UU, 2023).

Concerningly, the proportion of homicides where firearms were used has increased steeply in Sweden, from 16 per cent in 2010 (UN, 2014) to 40 per cent in 2021 (Sturup et al., 2018) and 54 per cent in 2022 (BRÅ, 2021a). In Europe, the equivalent proportion of homicides with firearms was seemingly more conservative, 13 per cent (UN, 2014). Nor has the other Scandinavian countries seen a similar increase in firearm-related violence (Khoshnood, 2019). 2022 saw the highest number of firearm casualties so far, with 63 casualties (BRÅ, 2021a). Sweden has roughly 10 million inhabitants (SCB, 2023); if the crime rate of 2022 constitutes a new normality, then the rate of firearm homicides, 0,06 per 100,000 inhabitants, is twice as high as the European average (UN, 2019, as referenced by Krüsselmann et al., 2023) and in the top

tier of the recorded European statistics (BRÅ, 2021b). The literature also reveals that the proportion of cleared homicide cases where firearms were the weapon of choice has also decreased from 95 to 50 per cent from the 1990s to the beginning of the 2010s (Sturup & Granath, 2018, as cited by Sturup et al., 2019). The proportion of firearm homicide cases with arrests is considerably lower in Sweden (56.1) compared to The Netherlands (75.5), Switzerland (93.3), and Finland (100) (Krüsselmann et al., 2023). Several indicators therefore imply, that the current situation is grave and needs to be halted.

Academic attention to firearm-related violence in Sweden is recent; a systematic review of the phenomenon found 25 eligible articles, of which only seven predate 2015 (Khoshnood, 2018). The review takes an explorative position and broadly surveys what is written about firearm-related violence, encompassing different contexts, academic fields, and units of analysis, but only one study explicitly researches offenders. It uses a sample of males (N=23) convicted for attempted and accomplished homicide drawn from an undisclosed town in Sweden. More is written about certain aspects of shootings, such as the temporal (Polisen, 2018; Sturup et al., 2018) and spatial patterns (Gerell et al., 2021). Shootings in Sweden have been observed to come in temporal waves (Polisen, 2018); shootings in three of the largest cities tend to repeatedly occur within two weeks (Sturup et al., 2018), and shootings have been observed to concentrate in neighbourhoods that the police regard as vulnerable and even more so in what are termed, 'Open Drug Scenes' in these neighbourhoods (Gerell et al., 2021).

A Vulnerable Neighbourhood is: "A geographically defined residential area characterised by a low socioeconomic standard where criminal elements impact the local community" (Polisen, 2017). In this sense, 'criminal elements' are persons who influence the neighbourhood negatively through criminality, anti-social behaviour, prolonged presence, or contributing to the displacement of majority norms (Gerell et al., 2020a). These constellations are often referred to as networks in Swedish contexts (Gerell et al., 2020a) but could arguably

qualify as street gangs as defined by the Eurogang Project: "A street gang (or troublesome youth group corresponding to a street gang elsewhere) is any durable, street-oriented youth group whose identity includes involvement in illegal activity" (Weerman et al., 2009: 20). The number of Vulnerable Neighbourhoods and their levels of vulnerability increased between 2014 and 2019 (Riksrevisionen, 2020). An Open Drug Scene is: "A geographic area, sustained in space and time, where the use and dealing of drugs take place in the public and is perceived as problematic by authorities and/or the public" (Magnusson, 2020: 6). The spatial patterns of shootings could thus be understood as generally concentrating in areas where persons who influence their surroundings negatively live, Vulnerable Neighbourhoods, and where drugs are sold and used, Open Drug Scenes. The temporal patterns also imply that shootings are contagious (Sturup et al., 2018) within these areas. These patterns have sparked the notion that shootings stem from conflicts among the members of local street gangs or other criminal constellations (BRÅ, 2015; Polisen, 2018; Khoshnood, 2017; Sarnecki, 2022). Indeed, 40 per cent of recent gang-related shootings occurred in Vulnerable Neighbourhoods or could be traced to offenders hailing from these areas (Polisen, 2021). No research has, however, yet studied the shooters specifically, hence the rationale for this research undertaking.

The Swedish National Council for Crime Prevention (BRÅ) have provided some insight into potential reasons for shootings. BRÅ interviewed 21 males, the majority aged between 18 and 30, who have been very "close to shootings" (BRÅ, 2019). The interviews describe a highly violent and volatile milieu. Shootings can occur 1) to launch a criminal career, 2) to avenge a previous violent act, or 3) to proactively counter another shooting which is believed to occur. The study finds that the high degree of decay of social status and constant social positionings means that considerable effort must be spent monitoring current events and assessing others' social positions and agendas. However, what group the respondents represent is not fully clarified; their own experiences of offending are, for apparently ethical reasons, not explored. The concept "close to shootings" encompasses respondents who have been victims, witnesses, or otherwise "know about the shootings" as they occur in their social contexts (BRÅ, 2019). These factors make the assessment of the representativity of the narratives difficult. The study provides insight into the dimension of "*why*" without satisfactorily addressing "*who*".

The knowledge of "*who*" could open the door to developing evidence-based policing policy to reduce shootings. This would then provide the right platform to promote the usage of the triple-T framework: *targeting* the offenders who are most at risk of committing shootings with lethal outcomes, *testing* what works and *tracking* the effects of the intervention (Sherman, 2013). Any subsequent evidence-based policy would then allow further refinement of the process of developing triage, diagnosis, and treatment (Abt, 2019)

1.2 The Aim of this Thesis

There have been recent academic advancements regarding the temporal and spatial aspects of shootings, but less relating to the shooters themselves. This thesis aims to fill the knowledge gap regarding suspects of lethal shootings (SLS) who also have been reported to have a negative influence in their local areas using the *Cylinder Method*, hereinafter called '*Cylinder nominees*' (CN). The thesis will strive to provide knowledge of the current *and* potential CN SLS. Knowing who the present CN SLS are could facilitate more efficient, effective, and responsive targeting, while knowledge of the future shooters could enable long-term targeting. The thesis will explore if there are observable risk factors within police data that are readily accessible and usable for estimating risk and reducing crime. The overall ambition is to provide practicians with knowledge that could be operationalised to reduce lethal violence.

1.3 Research Questions

The research questions are designed to explore the extent of shootings that hail from SLS and if SLS have unique and detectable characteristics and experiences preceding a lethal shooting. A comparison group of non-SLS CN will be used to provide the assessment of unique traits and experiences of the CN SLS. The first research question provides fundamental knowledge to assess the actuality of the CN as SLS. The second research question will explore the demographic characteristics of the now-known SLS using three sub-questions. The third research question surveys the experiences of victimisation and offending before a suspicion of a lethal shooting with three sub-questions, with the last exploring if any experience implies a higher risk of being followed by a lethal shooting. More precisely, the research questions and their sub-questions are:

Research Question 1:

To what extent have the persons identified as causing local distress with the Cylinder Method also been identified as suspects of shootings with lethal outcomes?

Research Question 2:

What is the distribution of demographic characteristics among the persons identified with the Cylinder Method who were suspected of shootings with lethal outcomes to those who were not? Sub-question 1: What are the central tendencies of age when a shooting occurs? Sub-question 2: What is the distribution of sex? Sub-question 3: What is the distribution of individuals born abroad?

Research Question 3:

What is the distribution of offending and victimisation among the persons identified with the Cylinder Method who were suspected of shootings with lethal outcomes to those who were not? Sub-question 4: What are the central tendencies of the onset of victimisation? Sub-question 5: What are the central tendencies of the onset of offending? Sub-question 6: Does any crime or combination of crimes, as committed or victimised, have a higher estimated risk of being followed by a shooting with a lethal outcome?

1.3 Thesis structure

This thesis consists of six chapters corresponding to its main components. The following chapter will review the current literature on suspects of lethal shootings to identify useful findings as well as any. The subsequent chapter will describe the design for gathering and analysing the data to answer the research questions. The findings will then be presented before their implications and limitations will be discussed. The last chapter consists of the conclusions of the thesis. Appendices providing additional methodical details will be found last.

1.4 Summary

This chapter has described the concerning escalation of lethal shootings in Sweden. Several overlapping aspects portray a troubling situation that needs to be halted. Some dimensions of the shootings have been more studied than others, little is yet known about the suspects of these shootings.

This thesis aims to produce new insights into the shooters that could augment the muchneeded decrease in lethal firearm violence. Three research questions and six sub-questions will explore those suspected of shooting with lethal outcomes. The research questions will explore the demographic characteristics of the shooters and the experiences preceding a lethal shooting with the intent of identifying circumstances that can be associated with an increased risk of lethal firearm-related violence. The next chapter will review the current literature to ascertain what is already known regarding suspects of lethal shootings in different contexts.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

While recent academic advancements in the understanding of different dimensions of lethal shootings in The Kingdom of Sweden (Sweden) have been made, they primarily relate to crimes (BRÅ, 2016; Polisen, 2017; Polisen, 2018; BRÅ, 2019; BRÅ, 2021a; Polisen, 2018; Sturup et al., 2018; Gerell et al., 2021) or cases (Sturup & Granath, 2018 as cited by Sturup et al., 2019). No research has thus far looked in depth at the offenders who shoot. This literature review will therefore focus on three adjacent themes in the current literature: *gang members* and *homicide offenders* and *gang members who commit homicide* that likely should provide referable knowledge to the group this thesis aims to study.

The literature search was conducted through a combination of systematic and spontaneous steps. The backbone consisted of completing systematic keyword chain searches on Web of Science. These were also expanded to Google Scholar and Google and supplemented by arbitrary searches. The title and authors of quintessential literature were re-entered into the Web of Science to find relevant literature that the first searches missed. Searches were conducted in English and Swedish. The last systematic search was conducted on April 19th, 2023. The last 'arbitrary' search was completed on July 3rd, 2023. An example of a keyword chain can be found in **Appendix A**.

The following sections will describe the current literature using the funnel approach when possible; intranational literature will first be presented, followed by European and Swedish literature. The reviewed literature on *gang members* will be presented first, followed by *homicide offenders* and *gang members who commit homicide*. Relevant characteristics for European and Swedish cohorts will be tabulated and presented in **Appendix B** to facilitate comparison.

2.2. The predictability of gang membership

Improved knowledge of risk factors for joining a gang could contribute insights that could help hinder the growth of gang populations. A summary of the literature in this field could, therefore, provide a vantage point for this thesis. One of the earlier works in the field divides risk factors into two categories: *correlating* risk factors of gang membership that primarily describe characteristics of gang members when they already have joined the gang, and *predictive* risk factors, characteristics that precede gang membership (Thornberry et al., 2002). Only three studies were referenced in the review; they looked broadly at-risk factors in several domains that might influence a person. *Prior Delinquency* occurs as having an increased estimated risk in two studies. The finding is interesting as it illuminates the possibility of identifying potential gang members using police data. A series of systematic reviews (Klein & Maxson, 2006; Krohn & Thornberry, 2007; Higginson et al., 2018; Calderoni et al., 2022) have since explored the factors associated with increased estimated risk of gang membership with mixed results.

A later systematic review expanded on identifying risk factors preceding gang membership (Klein & Maxson, 2006). The review identified three risk factors with consistent support and three with mixed support. The consistent risk factors related to personal circumstances, while the risk factors with varied support were found in the realms of adverse peer influence and family connections. These risk factors would likely not be detectable through police data. The definition of gangs was found to be lucid and broad, with variation in the designs adopted across the included studies.

The role of delinquency was particularly prominent when examining the results of a longitudinal study in Rochester, New York (Krohn & Thornberry, 2007). The study continuously interviewed adolescents and their primary caregivers over several years. The estimated risk of future gang membership was calculated using odds ratios (OR). *Violent*

18

Delinquency had the highest estimated risk (4.2), followed by *General Delinquency* and *Adverse Life Events* (3.3). The findings further strengthen the role and importance of prior offending. However, using interviews as a method to identify the prevalence of risk factors for gang membership is likely laborious, costly, and fraught with challenges for the police.

A more recent systematic review highlighted the centrality of prior offending (Higginson et al., 2018). It aimed to identify factors associated with increased estimated risk for gang membership in low- and medium-income countries and used the Eurogang Projects definition of a gang: "A street gang (or troublesome youth group corresponding to a street gang elsewhere) is any durable, street-oriented youth group whose identity includes involvement in illegal activity" (Weerman et al., 2009: 20). While the systematic review also accepted other gang definitions used by the authors of the included articles, including self-reported membership, it rejected studies of organised crime groups, terrorists and gangs performing piracy (Higginson et al., 2018). The review also uses OR and finds that the prior offendings rendered the highest estimated risk of future gang membership were *Prior Violent Delinquency* (5.8) and *Non-Violent Delinquency* (4.7).

The systematic review completed by Calderoni and colleagues (2022) identified 19 eligible studies, most from the UK and USA. The study finds that the factors with the highest OR were *Low Self-Control* (4.8) and a *History of Conviction or Fining* (2.9). It utilised a definition of organised crime by the United Nations: "A structured group of three or more persons, existing for a period of time and acting in concert with the aim of committing one or more serious crimes or offences" (UN, 2001: 5). Studies of terrorist groups, prison gangs and youth gangs were excluded from the review.

The reviewed international literature provides important contributions but also limitations. *Firstly*, some caution must be given regarding the synthesizability of the reviewed literature as the various articles and reviews use varied or unclear definitions of gangs. Literature based on self-reported definitions of gang membership are henceforth excluded to reduce navigation around more definitions than necessary. *Secondly*, all the above authors consistently state that no *one* factor can foresee a future gang membership and that risk factors can stem from different aspects of a person and their environment. *Delinquency* is found to be associated with an increased estimated risk in two systematic reviews (Thornberry et al., 2002; Calderoni et al., 2022), and *Violent Delinquency* is found to have an even stronger estimation of risk in two others (Krohn & Thornberry, 2007; Higginson et a., 2018). Thus, police data constitute a possible method for detecting individuals at risk for gang membership. The current European and Swedish literature on gang members will be presented next. Care will be given to describe the demographic characteristics of current gang members and knowledge surrounding crimes that are associated with higher estimated risk for future gang membership.

2.3 European gang members

Scholars and policymakers in Europe and Sweden have historically rejected the notion that gangs exist in Europe since the equivalent constellations to American street gangs could not be identified in Europe (Klein, 2000: Rostami et al., 2012). This could explain the modest number of European studies and the absence of studies that specifically explore relationships and predictive risk factors. The identified European studies which provided the most extensive breadth will be described in this section.

The oldest European study comes from The Netherlands. It uses data from the Dutch Organized Crime Monitor, using police data from 120 cases in which members of organised crime (N=854) were identified as offenders (Van Koppen et al., 2010). Most of the cohort were male and born in The Netherlands. The mean age was 38 years, representing the age when they were included in the database and considered members of organised crime. The cohort, which on average debuted at the age of 26, amassed mentions in seven judicial records before being

classified as a gang member. *Fraud* was the most common offence before and after classification. Organised crimes were constellations that made an illegal profit, committed serious crimes, and showed a fair capacity to parry interventions by authorities.

Fraud, as a crime classification, was once again found to be associated with increased estimated risk in a subsequent study from the Home Office (2013) in the UK (Francis et al., 2013). The data included randomly sanctioned offenders (N = 4,109) in England and Wales between 2007 and 2010 and was extracted using the Police National Computer. The mean and median ages of this population were younger than those of the Dutch sample, and a more significant proportion of the sample was male. Citizenship and ethnicity were measured, but the country of birth was not. Organised crime membership was calculated based on the offender's *probability* of belonging to that group. The date of membership was defined by the time of the sanction. The study estimates the OR of being convicted as a member of organised crime based on earlier offending history and compares several crimes using two comparison groups. The study presents detailed information on the estimated risk for many different crimes in different crime categories, The occurrences are analysed regardless of the sample size, meaning that occurrences range from 11 to over 3,000 persons. Some results show inconsistent risk with lower confidence intervals crossing the 1.0 line when controlled with MedCalc's web calculator, such as Driving Motorway Speeding - Pulled over (MedCalc, n.d.). Fraud -Conspire to Defraud amassed the highest OR (32.0).

A later Danish study (Pederson, 2018) challenges previous conclusions regarding the usefulness of prior offending as an indicator of increased risk of gang membership. The study compared the offending patterns of adult male criminal gang members (N=564) and cross-referenced all convictions since 1980 with police classification of gang members as registered in 2006 and 2009. The Danish police date gang membership based on the requirement of an intelligence observation of contacts within the milieu and suspicion of involvement in a serious

crime. The lead author notes that the Danish Police does not categorise different types of gangs. The central tendencies of age were not explored; most of the sample was born abroad. The gang members' mean onset age was slightly younger (16.3) than the control group's (16.8). Within this research setting, convictions can, at the earliest, be measured from age 15, the age of criminal responsibility in Denmark. The differences in the two groups' onset offences were modest and compared by calculating the proportion of prevalence of each crime in each group.

The European literature provides insight into the demographic characteristics of gang members. Comparability is complicated by the difficulty of defining gangs and gang membership. The findings regarding the circumstances associated with an increased estimated risk of gang membership do not align with the findings in the systematic reviews referenced in the last section, wherein *Violent Offending* when compared to other types of offending, had the highest OR (Krohn & Thornberry, 2007; Higginson et al., 2018). The European literature establishes the usefulness of analysing crimes within the conventional categories of Violent and Non-Violent Delinquency.

2.4 Swedish gang members

Swedish literature on gang members predating the 2010's has been difficult to locate despite an extensive literature search. This is not to say that adjacent themes have not been studied; notable contributions have been made exploring Swedish co-offending networks consisting of groups of individuals who have been suspected of the same crimes (Sarnecki, 2001; Mondani & Rostami 2022a).

The first study regarding the characteristics of Swedish gang members emerged in 2012. The authors describe Swedish gangs as identified by the Swedish Police Authority (Rostami et al., 2012). The authors investigated whether Swedish gangs could be categorised in the same way as American gangs using the Maxson-Klein typology and concluded that they could. The typology is described elsewhere (Klein & Maxson, 2006). The sample of male gang members (N=239) hailed from the seven most predominant gangs in Sweden based on the amount of available intelligence, open investigations, and convictions (Rostami et al., 2012). All gangs were self-indicating through attributes such as clothing, symbols, and tattoos. Offending among the gangs was compared by counting convictions but was not categorised or defined as occurring before or after gang inclusion. The mean age of the sample was 27.2, and most were born abroad. The study provides a useful reference for the subsequent research on Swedish gangs but does not bring clarity to different types of risk factors.

A further study undertaken by Rostami et al., (2018) vastly increased the sample size and introduced several types of criminal constellations. Among them, street gangs, networks and mafia have some degree of overlap with the cohort this thesis aims to study. The study defines street gangs as: "Self-indicating constellations with some territorial association", networks as: "A miscellaneous group of offenders who have offended together for a certain amount of time but lack a clear membership to any specific constellation", and mafia as: "Groups that can influence politics, cultural, or economic institutions". The study constructed a dataset of crime suspects between 1996 and 2016 and 2011 and 2016. The police helped to identify which of the suspects were members of different types of gangs. The study finds that the members of street gangs (N=5,094) had the highest proportion of individuals suspected of crimes (92.2 per cent), the lowest mean age, the highest proportion of male members, and most of its members were born abroad. The network members (N=776) were similarly criminally active but had a slightly older mean age, the lowest proportion of male members and a minority of its members having been born abroad. The mafia members (N=486) were close to street gang members regarding gender distribution and age, and the proportion born abroad was similar to members of networks. The study considers no temporal distinctions and did not clearly discern whether the presented criminality occurred before or after gang membership.

A more recent study (Mondani & Rostami, 2022b) re-uses the previous study's dataset but redefines street gangs. The definition is now based on how front-line police officers have observed and reported gang membership; the gang members no longer need to be selfindicating. The sample consists of 954 unique individuals, 85 of which being reported as belonging to more than one street gang, which obscures some clarity regarding the demographics of the gang members. The mean age of the sample was 30.4, and most were male. The proportion born abroad was not accounted for. The study reports that an increase in economic crime correlates with an increase in violent crime. It is, however, not established if these findings emerged before or during gang membership.

The last study, an unpublished Cambridge Master of Studies Thesis, is the only identified study that researches the same population as this thesis. It looks at the first reported batch of *Cylinder nominees* (CN), individuals identified using the *Cylinder Method* (Nilvalll, 2021). The *Cylinder Method* identifies individuals that negatively influence a residential area; the technique is described more in-depth in the Methods chapter of this thesis. The only demographic characteristic of the sample (N=4,066) relates to the mean age of 27.9. The thesis assesses if inclusion within the *Cylinder Method* influenced the criminal activity of the CN as measured by crime counts and harm. The findings reveal that the crime counts of victim-reported crimes decreased by four per cent while the police-initiated crimes decreased by eight per cent. The harm of victim-reported crime increased by eight per cent. The result can thus be interpreted as the CN committing fewer but more harmful crimes after becoming CN, but the study has no comparisons.

Few findings seem consistent when assessing the literature from an international vantage point and then narrowing to a specific Swedish context. Different definitions of gangs are used in the Swedish literature, and little knowledge of varying risk factors has been identified. However, a fair portrayal of Swedish gang members' demographic characteristics exists, which roughly could be described as "*younger but proportionally male and foreign*" to their European counterparts.

2.5 The predictability of homicide offending

Homicide offenders, the second theme, should, to some extent, encompass suspects of lethal shootings (SLS). This section will explore the international literature that describes homicide offenders (HO) in relation to comparisons of non-HO.

An early study (Shumaker & McKee, 2001) compared juvenile males (N=30) charged with homicide to males (N=62) charged with other violent crimes across 33 different variables. Both cohorts were referred to psychiatric evaluation awaiting trial between 1987 to 1997. Data were retrieved from hospital charts, and from police and court records, amongst other sources. The individuals who committed homicide had experienced *Prior Arrest* and *Sexual Abuse* to a lesser degree but *Physical Abuse* within the family to a higher degree. The study shows that risk factors for homicide offending are detectable in police data.

The next study reported by Loeber et al., (2005) is a longitudinal study, which follows a group of males in Pittsburgh over a prolonged period, measuring the prevalence of 63 variables relating to varied aspects of the youths' environment through repeated interviews and court records. The reported findings reveal that 11 of the 63 variables had statistically significant differences between the persons convicted for homicide (N=33) when compared to the persons who were convicted of other violent crimes (N=691). Three variables, *Carrying a Weapon*, *Engaging in a gang fight*, and *Selling Hard Drugs*, were more than twice as frequent among the HO than the controls. The study confirms the potential and value of scanning prior criminal events within police data.

The dataset used in the last study was reused with the addition of new data by Farrington et al., (2012), resulting in the number of male convicts for homicide (N=37) increasing slightly.

The study then examined this cohort compared to non-homicidal males (N=1,406). Following analysis, findings revealed 70 per cent of the HO were arrested for crimes before age 14 years, compared to 28 per cent of the controls. Overall, the crimes included in the *Violence* category showed higher OR (between 3.9 and 7.6) than those within the *Property* and *Other* category. *Aggravated Assault* had the highest OR (7.6), followed by *Weapons Crime* (7.0), which regrettably was not defined, and *Simple Assault* (6.6).

The studies mentioned above provide encouraging support for using police data to scan for potential HO. Furthermore, it actualises the usefulness of analysing broader categories than *Violent* and *Non-Violent Offending* even though prior *Violence* is a re-occurring factor associated with increased estimated risk for homicide. Yet, once again, it must be acknowledged that sole risk factors when assessed independently impede the opportunity to predict, or foresee an outcome, yet valuating a range of circumstances with an increased estimated risk can result in a bigger predictive value and greater opportunities (Loeber et al., 2005; Farrington et al., 2012). Another observable fact is the various legal statuses of the offenders in the samples. The studies mentioned above are methodically robust for including comparisons but also suffer from biased samples of young males. The next section will explore literature on European HO.

2.6 European homicide offenders

Notable contributions to the comparability of homicides across Europe have been made thanks to the European Homicide Monitor collaboration (EHM). The collaboration was constructed to overcome the difficulty of comparing characteristics of HOs between countries with different legislations (Liem et al., 2013). A recent study that stems from the EHM partnership compares and describes the demographic characteristics of HOs who have used firearms to those who have not (Krüsselmann et al., 2023). The study describes the HO of both cohorts from four countries, Finland (N=206), The Netherlands (N=1,292), Sweden and Switzerland (N=223) across specific demographic characteristics (the Swedish cohort is not presented in this section). The proportion of male offenders is homogenous throughout the three countries regarding the firearm HO and non-firearm HO, with males constituting most of the offenders. The mean age is considerably lower for firearm HO from The Netherlands compared to Switzerland and Finland, 32 years compared to 42 and 45 years respectively. The same trend is observable among the non-firearm HO but with a lesser age difference. A large proportion of the HO of both cohorts are born in Finland compared to The Netherlands and Switzerland for both firearm HO. The study provides a unique European comparison, as far as the literature search could establish, between the demographic characteristics of HO who use firearms and those who do not. However, it does not report on any measures of prior offending.

The remaining part of this section will describe recent findings describing HO from a selection of Western European countries These studies regrettably lack comparison groups but contribute with details regarding prior offending. A study from 1999 (Salfati & Canter, 1999) aimed to identify different profiles of HO by grouping different characteristics. The sample encompassed British HO (N=82) from an unspecified number of years before and after 1990. The offenders came from solved stranger homicide cases, which were not further defined. Prior *Victimisation* was not researched, but 40 per cent of the cohort had a previous *Prison Sentence*, whereas the most significant proportion was convicted for *Property Crimes*. The mean age was 27 years, and most were male; no detail regarding the country of birth was depicted. The study provides modest evidence that prior offending predates homicides, but the sample size is notably small.

Another UK study from 2007 gathered a larger sample with convicted male murderers (N=786) from England, Wales, and Scotland (Dobash et al., 2007). It used a dataset compiled for the "Murder in Britain" study, which regrettably could not be located. Therefore, there is

some uncertainty as to how the sample was collected. The authors report that the sample size represents 20 per cent of all imprisoned men for murder in the UK and 30 per cent of those in Scotland. Case files of murderers were used for measuring a multitude of variables. The analysis found that the prevalence of offending before the conviction varied. The HOs were divided into three subsets based on the age of onset: those who started offending early at the age of 15 years or younger, those older and those with no offending history. The early-onset offenders were "more experienced as victims and offenders" than the other two groups. The mean age of the early offenders, 27.5 years, was younger than the late-onset offenders and younger than those with no criminal history. All three groups had a similar proportion of offenders who were born abroad (around 10 per cent). The study shows that several adverse life events can predate homicide and can emerge both in childhood and adulthood. The study explores prior criminal behaviour and degrees of violence but lacks precision regarding the types of crimes that could constitute early warning signs for severe future crime.

A Finish study (Lehti & Kivivuori, 2012) makes a valuable contribution in sharing the recorded findings regarding prior offending. It describes HO using data from the Finnish Homicide Monitoring System Data collected between 2003 and 2008 but only gathers information regarding the primary suspect of each case (N=691). The mean age was not reported in the study, but the median age of the sample was 37 years; most HO were male and a very small proportion were born abroad. Most of the offenders of both sexes had been charged with a *Violent Offence* five years before the homicide. The study is the first identified European study to reaffirm international findings regarding prior violent offending preceding homicide. The low proportion of HO born abroad is consistent with later Finnish findings (Krüsselmann et al., 2023).

The European literature could not provide consistent findings to compare coherently with the international literature. When demographic details were rich, the research instead lacked details regarding prior offending (Krüsselmann et al., 2023). If it contained some information about prior offending, the sample size was small (Salfati & Canter, 1999), biased (Dobash et al., 2007) or otherwise restricted (Lehti & Kivivuori, 2012). Other articles have been reviewed but excluded for similar reasons, including small sample size, lacking specificity regarding observations of prior offending (Gottlieb et al., 1990), or only reporting on some demographic characteristics and excluding information regarding prior offending (Markwalder & Killias, 2011; Suonpää et al., 2022; Thomsen et al., 2021). *Prior offending* is, however, to some extent a re-occurring factor predating homicide in the above-reviewed literature.

2.7 Swedish homicide offenders

A relatively early Swedish study by Sturup & Lindqvist (2014) looked at a local sample of convicted HO from northern Stockholm (N=153) between 1970 and 1980. It primarily aimed to distinguish the characteristics of homicide recidivists but also reports on general HO characteristics. The mean age was 35.7 years; most were male, with a minority born abroad. The study reports that 40 per cent of the HO had a prior record of a *Grievous Violent Crime* before the homicide conviction. The study provides modest support for the proposition that HO have a violent history but again draws upon a small and unrepresentative sample.

The sampling was improved in a study from 2017, which looked at all males convicted of homicide in Sweden (N=211) between 2007 and 2009 (Caman et al., 2017). The study aimed to distinguish characteristics between intimate-partner homicide offenders (IPHO) and other HO. The median age of the non-IPHO was 29 years, most offenders were born abroad, and just over half of the cohort had a prior conviction of *Violent Conviction*. No data of prior offending attained an OR above 1.0 when comparing the IPHO (N=46) to non-IPHO (N=165). Instead, lower ORs were observed, indicating that prior offending meant a lower estimated risk of subsequent homicide, but sample sizes in the two cohorts were still small.

The more recent study by Khoshnood et al., (2020) rectifies the notable exclusion of females and increases the sample size significantly (Khoshnood et al., 2020). The study aimed to investigate if groups of offenders could be identified among the sample (N=14,446). The data was collected between 2000 and 2015. It, however, mixes suspects and convicts of homicide and attempted homicide and excludes offenders older than 60. Still, the observed mean age was the oldest yet, 39 years, with the proportion born abroad being low. Most offenders were male but to a lesser extent than observed in Swedish studies. Just under half of the sample had a prior conviction of a *Violent Crime*. The study utilises a larger but mixed sample compared to other Swedish studies. The sample also suffers from age bias.

A very recent study by Khoshnood and colleagues (2023) encouragingly provides some sample clarity by looking at all suspected firearm HO (N=889) between 2000 and 2017. The study aimed to categorise different firearm offenders through latent class analysis. The central tendencies for age nor country of birth were reported, and HO above the age of 60 years were excluded. Most offenders had a prior conviction of a *Violent Crime*.

The demographic characteristics of Swedish HO who use firearms (N=199) have recently been compared to 1,024 non-firearm HO (Krüsselmann et al., 2023), as described in the previous section. The study reports the Swedish proportion of male offenders in both cohorts is the highest among the countries compared (Finland, The Netherlands and Switzerland) for both firearm HO and non-firearm HO. The mean age of the Swedish cohorts is slightly older than the Dutch, making the Swedish firearm HO and the non-firearm HO cohorts the second youngest among the countries compared. The Swedish cohort was, to a larger extent, born abroad when compared to the Dutch and Swiss but less so than the Finnish, but provides no information on prior offending. This remaining part of this section will seek to further explore the literature that lacks evaluation of comparison groups but offers important contributions concerning knowledge of prior offending. Patterns regarding Swedish HO can be distinguished in the reviewed literature. These include the actuality of a violent history and the seemingly unique demographic characteristics, younger age, higher proportion of male offenders and lower proportion of born abroad compared to their European counterparts. However, Swedish studies from which demographic characteristics can be derived suffer from biases such as age (Khoshnood et al., 2020; Khoshnood et al., 2023) or sex (Caman et al., 2017). Additional studies were identified but excluded for different reasons. These ranged from not including a history of offending nor comparative demographic characteristics to the other studies (Liem et al., 2013, Sturup et al., 2019), having a small sample size (Khoshnood & Väfors Fritz, 2017) or not adequately distinguishing prior criminality while mixing groups that constitute the sample (Trägårdh et al., 2016).

2.8 Gang members who commit homicide

The last theme represents an attempt to combine the two other themes. Only one article was identified that studied homicidal gang members; the research published by Adams & Pizarro (2014). It compares 140 male career criminals arrested for homicide divided into gang (N=59) and non-gang members (N=81) in New York. Gang members had a younger mean age (23.9) than non-gang members (30.0); country of birth was not reported. The study set out to investigate patterns of different crime categories preceding homicide between the two cohorts and found that a prior *Drug Arrest* had the highest risk of being preceded by an arrest for homicide for both gang members and non-gang members. The study is interesting because it compares two cohorts and different crime categories to each other. However, only the primary offender for each case was included, and career criminals were defined as those having more than five arrests before their arrest for homicide. Further, the identification of gang members

was conducted by the local police, but qualification criteria were not disclosed. Yet again, gender bias was introduced alongside an already unrepresentative and small sample.

Other literature was surveyed but excluded for using an un-synthesisable unit of analysis. These include different units of analysis, such as gang homicides (Howell, 1999; Maxson et al., 2002) or combinations of gangs and jurisdictions (Scott & Bennet, 2021; Valasik & Reid, 2021).

2.9 Summary

This literature review began by asserting that Swedish gang members who commit homicide using firearms are rarely the focal point of published research. Therefore, the literature review aimed to explore adjacent themes that could describe the aspects of this cohort. The result can best be described as a patchwork that, at best, provides rough outlines for understanding SLS in street gang contexts but also suffers from several limitations. These include gender and age biases, absent comparison groups or information on the history of offending and unclear sources of data or definitions of gangs.

Systematic reviews encompassing studies aimed at identifying potential HO and gang members contribute in two valuable ways: *Firstly*, they accentuate the need to distinguish between predictive and correlating risk factors (Thornberry et al., 2002; Klein & Maxson, 2006; Krohn & Thornberry, 2007; Higginson et al., 2018; Calderoni et al., 2022), and *secondly*, they show that criminal history can be associated with an increased estimated risk (Thornberry et al., 2002; Krohn and Thornberry., 2007; Higginson et al., 2018; Calderoni et al., 2018; Calderoni et al., 2022; Farrington et al., 2012). The promising aspect of this assessment is that information regarding prior criminality is accessible for the Swedish Police. The next chapter will present the research design and accompanying methodology for this thesis while drawing upon what has been learned through the literature review.

CHAPTER THREE: METHOD

3.1 Introduction

The previous chapter reviewed the existing literature on suspects of lethal shootings (SLS) in different contexts. No European or Swedish study was identified that researched gang members who commit shootings with lethal outcomes. This thesis aims to generate new insight into the cohort. This chapter will present the research design intended to generate the answers to the research questions which hopefully can provide an opportunity for reducing the lethal shootings in the Kingdom of Sweden (Sweden).

The research questions require the assembly of a unique dataset. This chapter will first describe the operational settings and then the design for data collection, management, and preparation for analysis. Finally, it will convey the known limitations of the data and the strategy for the analyses.

3.2 Operational Setting

This section will briefly describe Sweden as a country and how the Swedish Police Authority (Police) is structured. With its 10.5 million inhabitants, Sweden has the largest population of the Scandinavian countries (Swedish Institute, 2023). It is the largest of the Nordic countries (Nordic Co-Operation, 2023) and the third largest of the European countries (European Union, 2023). Just under 2 million people live in the three largest cities, Stockholm, Göteborg and Malmö (Swedish Institute, 2023).

Policing in Sweden is a national authority overseen and led by the National Police Commissioner (Polisen, 2023b). Sweden is geographically divided into three organisational levels from the 194 smallest geographical units, local police districts, to the seven largest, police regions (Polisen, 2023c). The total workforce is 36,000 (Polisen, 2023d), with officers accounting for 63 per cent of available numbers. BRÅ is the authority responsible for collecting Swedish Crime Statistics (BRÅ, 2023a). The overall level of crime in Sweden has been stable over the last decade (BRÅ, 2023b). Murder and manslaughter have, however, increased since 2015 (BRÅ, 2023c). Statistics regarding shootings are not part of the official Swedish statistics (Förordning om den officiella statstiken, 2001) but is compiled and made accessible to the public by the police (Polisen, 2023a).

The police have, by order of the Swedish Government (Regeringen, 2020) conducted biannual assessments of the level of vulnerability among the residential areas within the country. Häggström and Brun (2019) describe that identifying and classifying Vulnerable Neighbourhoods aims to aid local police districts in assessing the state and scope of their societal problems and providing a national overview of vulnerability for the national police leadership. The current process provides insights into the coordinative capacity needed to manage problems with criminal constellations and is tailored to identify organised crime and parallel societal functions that affect residents negatively.

The current, and accepted, organisational view argues that Vulnerable Neighbourhoods consist of local cliques who negatively influence an area through their behaviours and actions; 1) committing violent crimes openly, 2) overtly selling illegal substances and 3) rioting to show explicit and violent content towards society (Hallin & Westerdahl, 2020). These problems erode the public's trust in the police, affecting their willingness to report crimes and exacerbating the police's ability to improve conditions in the area (Hallin & Westerdahl, 2020.) The prolonged presence of these individuals can also lead to behavioural changes among the public, such as avoiding certain areas at certain times (Gerell et al., 2020a), which can cause corrosion of majority norms and further establishment of parallel societal functions (Gerell, 2020).

After assessing if any area is vulnerable, the person(s) responsible for contributing to this state are identified using what is commonly referred to in police parlance as the *Cylinder Method* (Gerell et al., 2022). The *Cylinder Method* is a recognised process for identifying

individuals contributing to and causing vulnerability within a residential area (Nilvalll, 2021). The negative influence can be *active*, such as criminal activity, and *passive*, such as causing insecurity by hanging out in groups and engaging in anti-social behaviour (Gerell et al., 2020a). Any person selected for inclusion within the Cylinder Method is graded on a scale from A to D, the inclusion and grading is based on professional judgment (Gerell et al., 2020b). The scale represents the person's organisational capacity, which often corresponds to an age span (Gerell et al., 2020b). The grade of A is usually given to older individuals at the top of a criminal food chain; individuals assigned grade B are actors perceived to operate as middle management within criminal enterprises who often control street-level crime such as drug dealing (Gerell et al., 2020b). The 'C Grade' actors are the street-level crime "doers" selling illegal drugs, dealing in criminal conflicts. and the 'D grade' actors are often young "hangarounds" associated with, primarily, C-actors, who reside and associate in the same neighbourhood (Gerell et al., 2020b). Individuals identified with the Cylinder Method could arguably qualify as members of street gangs using the Eurogang Projects definition: "A street gang (or troublesome youth group corresponding to a street gang elsewhere) is any durable, street-oriented youth group whose identity includes involvement in illegal activity" (Weerman et al., 2009: 20).

3.3 Study design

This thesis utilises a retrospective case-control design. A retrospective study gathers historical data (Altman, 1991). A case-control study compares two similar groups who differ on a known outcome (Spiegelhalter, 2019). Case-control studies are preferably used to look for rare outcomes in smaller samples than those needed in a cohort study, which instead surveys what happens after a specific exposure (Melamed & Robinson, 2019), necessitating a larger sample (Altman, 1991).

3.3.1 Population

The population consist of all persons who have been 1) ever have been reported as CN and 2) considered to be SLS between 2018 and 2022. The entire population is studied.

3.3.2 Unit of analysis

Two units of analysis feature within the analytical strategy. The first research question uses SLS as the unit of analysis and measures the proportion of CN among them. The second and third research questions look at the CN and compare those who are SLS to those who are not in different aspects. These include the demographic characteristics, age of onset for victimisation and offending and experiences of offending and victimisation preceding a suspicion of shooting with a lethal outcome or equivalent time for the comparison group.

3.3.3 Data capture and assembly

All known Swedish SLS between 2018 and 2022 were first extracted from a computer system called STATUS: Brottssamordning. The extraction identified 701 persons using the two crime codes (0312 and 0313) for lethal shootings encompassing *accomplished murder, manslaughter, and assault with a lethal outcome* towards a female or a male (BRÅ, 2023d). The Swedish Personal Identity Number was extracted for each suspect. All Swedish citizens have a unique Personal Identity Number (Skatteverket, 2023). However, the Personal Identity Numbers of 71 persons could not be accessed due to data restrictions; duplicates were also removed. Finally, 526 unique individuals were identified as SLS.

The next step involved cross-referencing the Personal Identity Numbers of the 526 SLS to the national list of all CN ever identified. NOA UND has the national list and helped to combine the two datasets. This resulted in the identification of 258 individuals who were both SLS and CN. Table 2. depicts the population characteristics. The CN SLS sample is compared
to non-CN SLS and the total population of CN. The non-CN SLS are older than the CN SLS and the whole population of CN. The age range for all CNs was not attainable. Age is calculated as of December 31st, 2022, to provide a universal point in time to count age.

	NON- CN SLS	CN SLS	ALL CN
AGE: MEAN	32.7	24.9	25.5
AGE: SD	15.7	6.1	9.2
AGE: MEDIAN	27.2	23.3	23.0
AGE: RANGE	14.5 - 99.7	15.6 - 99.7	-
PER CENT MALE	85.8	99.4	95.4
Ν	269	258	13,094

Table 2: Population characteristics

3.3.4 Comparisons

The list created with *the Cylinder Method* has been revised four times between the years 2018 to 2022. If an individual had not received a grade for any reason, such as imprisonment, decreased observations, or a move from the district, that person would receive a grade of X¹ for the corresponding period. All individuals on the list created by the *Cylinder Method*, therefore, have a four-letter code consisting of A to D and X. This code essentially constitutes a "criminal career code". For instance, the criminal career code of XXXD means that the person has been included once and is perceived to have low organisational prowess, receiving the lowest grade. The opposite could be said for an individual assigned the code AAAA who has been consistently evaluated as a criminal leader. The perceived value of identifying comparisons using the criminal career codes and a one-to-one matching is that individuals with identical criminal career codes may have similar exposure to confounding variables (Sjölander et al., 2012). This means that any differences in exposure to varying experiences can be analysed (Altman, 1991).

¹ As explained by Fredrik Marklund, Analyst at NOA UND in personal correspondence.

Having identified 258 SLS, their respective criminal career codes could be used to identify comparisons within the same criminal career code group. The data representing the CN within each criminal career code group and the number of possible comparisons within each group can be found in **Appendix C**; 258 SLS were be matched to 11,403 non-SLS. These CN non-SLS constitute 87 per cent of the whole CN population (N=13,094).

NOA UND was given the list of the 258 SLS to conduct the matching process using IBM SPSS. Statistics version 26. All 258 SLS were randomly assigned a number between 1 and 1.000.000. The same was done for the 11,403 non-SLS. The SLS with the highest number within their respective group was paired with the non-SLS with the highest number. One SLS with the criminal career code of BBXC was removed from the sample since it had no comparison, leaving 257 individuals from each cohort available for further analysis.

3.3.5 Data extraction

Once the comparison group had been identified, the extraction of data was conducted. The Personal Identity Numbers of the two cohorts were used to extract four types of data: *crime codes*, *dates*, *genders*, and *countries of birth*. All occurrences of experiences as victims and offenders were extracted. The National Department of Information Technology (NDIT) helped extract the data from a specially built program for the cause, which extracted information from the computer system where police reports are filed and criminal investigations are conducted, Durtvå.

The NDIT was asked to extract all occurrences in the form of crime codes and their respective dates. The crime code system contains 1,440 different crime codes; all occurrences were extracted for all individuals in both cohorts, as victims and offenders. The NDIT was asked to extract all information as is and not restrict the extraction to the date it occurred. This resulted in an extraction of experiences that predate the age of criminal responsibility. Crimes

38

committed by minors under 15 years result in a police report in Sweden but not a preliminary investigation. The extraction resulted in 11,642 rows of data, each representing a unique experience as a victim or offender. The extraction process also identified a group of non-SLS consisting of 98 individuals with no prior experience of victimisation or offending. Table 3. shows the distribution of victimisation and offending within the two cohorts.

Crime dates can be registered in three ways in Durtvå. The date can either be 1) *exact*, as stated by a witness or victim or 2) defined by a starting and/or ending date depending on the known time frame in which the crime could have occurred. A starting *or* ending date must be entered if the complete time frame is unknown.

Each person's country of birth was accessed through a computer system called Murmel. Murmel extracted a large quantity of information relating to the offenders, such as addresses, phone numbers, citizenship, and country of birth. The country of birth was dichotomised as "YES" or "NO", relating to if the person was born abroad. The surplus of information was deleted. The specific countries of birth were not recorded due to sensitivity and legal restrictions in data storage regarding such information.

OCCURRENCE	SLS	NON-SLS
Victimisations	358	445
Offending	6,221	4,520
SUM	6,579	4,965

Table 3: Total number of extracted offendings and victimisations per cohort

3.3.6 Data management

Most extracted data needed careful management before analysis could be conducted. Data was managed using Microsoft Excel and involved three principal activities: *programming*, *defining*, and *cleaning*. 'Programming' primarily involved creating formulas and using the Power Query function to calculate specific parameters such as age. The first calculations

involved extracting the date of birth from the Personal Identification Number and then calculating the offenders' age.

The processes of 'defining' mainly revolved around the extracted dates. Since all three possible crime dates were extracted, a hierarchy needed to be established to ascertain which date would be analysed when a crime had more than one crime date. Exact crime dates were given the highest rank, followed by starting and ending dates. Starting dates were chosen before ending dates since the start of an exposure or, in this case, a victimisation or offence, is likely to be more interesting to analyse. Having decided what crime date to analyse further, another formula was used to calculate the offenders' age for the occurrences of offending and victimisation. The next step to 'defining' the data, having decided what crime date to use, was to establish if an event occurred before, or after, a lethal shooting. Since some SLS were suspected of more than one shooting within the data, there was a need to define which of those to analyse further. The first shooting was selected. All crimes were coded as occurring before, after, or, on the same date as the shooting. The non-SLS needed an equivalent time frame for comparing their experiences of victimisation and offending. Corresponding dates were identified within the criminal career groups. The first date when the oldest SLS was suspected of committing a lethal shooting was also used as the cut-off date for the oldest non-SLS criminality, and so forth. Only data identified as occurring before the lethal shooting or the equivalent cut-off date was included in the analysis. All non-SLS experiences of victimisation and offending were therefore coded as occurring before, after and on the same date as the cutoff date. Table 4. depicts the remaining experience data before a shooting and its corresponding cut-off date to be analysed within each cohort. The final aspect of 'defining' was establishing which incident constituted the onset of offending and victimisation for each individual. All persons were sorted using Custom Sort in Excel by their Personal Identification Numbers and the Date of Crime of their respective experiences. A new variable was created containing the onset age, which was then analysed.

OCCURRENCE	SLS	NON-SLS
Victimisations	164	194
Offending	2,855	1,923
SUM	3,019	2,117

Table 4: Analysed number of extracted offendings and victimisations per cohort.

'Cleaning' involved removing repeated crime occurrences, or duplications, for each person. This was conducted to prepare the data to answer sub-question six. Occurrences as victims and offenders were dichotomised as "0", meaning no occurrences, and "1", indicating any occurrence. Data was sorted using the Custom Sort function in Microsoft Excel: the Personal Identification Number and the Date of Crime were used to establish which experience occurred first. The steps of dichotomising occurrences were also the first step for preparing the data for analyses of possible combinations of crime codes. This was finalised using "IF" and "COUNTIF" formulas in Microsoft Excel that would return a set value if a person was suspected of crimes A and B, and so forth.

Data management was conducted through a series of steps. Extensive revisions resulted in the construction of new Excel files to ensure that data could be reconstructed if the data was ever lost, destroyed, or corrupted. All changes were systematically logged. All analyses were conducted twice to ensure that the results were correct. All data was handled and stored in compliance with police regulations. As theses do not constitute research according to Swedish legislation, they are exempted from ethical reviews (Lag om etikprövning av forskning som avser människor, 2023).

3.3.7 Data limitations

Data limitations emerging within this study relate to missing data and the necessity of coding. The first extraction of SLS contained 51 individuals who could not be identified. The exact impact of the missing data is difficult to assess; none or all could be CN. Similarly, their experiences of offending and victimisation are unknown.

Another limitation relates to the need to interpret and code crime dates. All crimes are registered as having one or two dates referencing when they occurred. This is precarious and will always be the case with Swedish crime data unless research is explicitly conducted on crimes recorded at one of the temporal points. As previously described, a hierarchy was arbitrarily constructed to choose *one* crime date to analyse over another when two existed. The aspect potentially influences all analysis involving any date, such as if a crime occurred before or after a shooting or what crime occurred when. Lastly, 0.006 per cent (N=7) of the offendings and 1 per cent (N=3) of the victimisations had no recorded dates and were excluded from analyses. As were crime codes for incidents in police reports, such as *Lost Property*, that are not criminal experiences.

3.3.8 Data Analysis

All data management was conducted with the intent to facilitate effective analysis. Subquestions one, four, and five were analysed using formulas in Microsoft Excel to calculate median, mean, and standard deviations. Sub-questions four and five required the filtering out of ages when a crime was committed that was not an onset of victimisation or offending. Microsoft Excel's 'sort' function was used with each variable to identify the age ranges within each variable. Research question one and sub-questions two and three were analysed by calculating proportions.

Sub-question six was analysed using OR. ORs are often used in epidemiology to measure the estimated risks of exposures in relation to known outcomes (Altman, 1991). A formula was programmed in Microsoft Excel to calculate the OR with these steps: a = the number of SLS with an experience, was multiplied by d = the number of non-SLS without that experience, that value was then divided by the sum of; b = the number of non-SLS with an experience, multiplied by c = the number of SLS without that experience (Altman, 1991). Microsoft Excel was also programmed to calculate the 95 per cent confidence interval (CI). The lower and upper CI describe the variability observed within 95 per cent of the sample, meaning that a shorter range between the upper and lower CI portrays a more occurring prevalence than a more extensive range (Gardner & Altman, 1986), 95 per cent is conventionally used when calculating CI, other levels are and can be used (Spiegelhalter, 2019). The 95 per cent CI will be used to ensure that the risk estimation is equal, which is necessary to assess the observed OR's consistency (Altman, 1991). Calculating the CI first meant calculating the standard error of the log odds ratios abbreviated SE $\{\ln(OR)\}$, (Altman, 1991), which was conducted using the formula =LN for each OR. The upper CI were obtained using the formula =EXP. The SE $\{\ln(OR)\}$ was added by 1.96 and multiplied by the square root of the sum 1 divided by a, plus 1 divided by b, plus 1 divided by c and 1 divided by d (Altman, 1991). The lower CI were calculated the same way, but the SE{ln(OR)} was instead subtracted by 1.96 (Altman, 1991). The complete formulas can be found in Appendix D. The Z scores and p-values were not calculated as the thesis studies a whole population, not a sample (Borg & Westerlund, 2012).

The Microsoft Excel formulas =COUNTIF were used to calculate the sample size for OR calculations, and =IF was used to calculate the aggregated sample size of crime code combinations. The calculations conducted using the formulas in Excel were tested using the MedCalc web calculator (MedCalc, n.d.) to ensure accuracy. The same values were shown for the programmed formula and the MedCalc web calculator. The Microsoft Excel function

'Conditional Formatting' was used to identify cells where the base for calculating the OR was equal to or larger than 26 persons, both counting all SLS and non-SLS who had a particular experience. This was calculated by adding the number of SLS with experience to the number of non-SLS with the same experience. This number was chosen as it represents 10 per cent of the 257 SLS. Creating formulas in Microsoft Excel to perform the OR calculation meant that they could easily be copied to perform the large number of analyses needed when sufficient sample size was observed.

3.4 Summary

This chapter has presented the design and methods used to answer the research questions. The chapter has described the dataset that needed to be created to identify the cohort and its comparison cohort. All known offenders of lethal shootings in Sweden between 2018 and 2022 were extracted and cross-referenced with all known members of CN for the same period. The identification of comparisons using an identical "criminal career code" has also been described. Once the cohorts were identified, the following sections described how the data of crime codes, dates, and country of birth were extracted. Crime codes both contained the cohorts' experiences of victimisation and offendings. The data management regarding refining, programming and cleaning which prepared the data for the analyses was explained. The last section of the chapter presented the analyses used to answer the research questions. The next chapter will present the findings associated with this research undertaking.

CHAPTER FOUR: FINDINGS

4.1 Introduction

The previous chapter described the design and methods employed to investigate and answer the research questions. This chapter will present the findings in four main sections. The first two research questions will be presented in the first two sections. The last research question will be divided into two separate sections. Tables and forest plots will be utilised to visualise some findings.

4.2 The proportion of SLS who also are CN

The first research question asked, "*To what extent have persons identified as causing local distress with the Cylinder Method also been identified as suspects of shootings with lethal outcomes?*". Just under half (N=258, equalling 46.8 per cent) of the known SLS are also *Cylinder nominees* (CN). The answer was generated when the SLS was cross-referenced with the CN list.

4.3 The demographic characteristics of the SLS

The second research question asked, "What is the distribution of demographic characteristics among the persons identified with the Cylinder Method who were suspected of shootings with lethal outcomes to those who were not?". It contained three further sub-questions investigating central tendencies of age, gender distribution and proportion born abroad. The answers to these questions are illustrated in Table 5. The findings show substantial similarity across all variables for the two cohorts.

DEMOGRAPHICS	SLS	NON-SLS
AGE: MEAN	23.9	24.1
AGE: SD	7.5	7.6
AGE: MEDIAN	21.7	21.9
AGE: RANGE	14.8 - 56.5	14.6 - 68.6
PER CENT MALE	99.4	99.2
PER CENT BORN ABROAD	44	48
Ν	257	257

Table 5: The demographic characteristics of the SLS

4.4. The central tendencies of the onset of victimisation and offending.

The third research question asked, "What is the distribution of offending and victimisation among the persons identified with the Cylinder Method who were suspected of shootings with lethal outcomes to those who were not?". This section presents the findings of the first two subquestions relating to ages of onset. The results are shown in Table 6. The SLS are younger on almost every measurement except for the median age of onset offending, which is identical between the cohorts. The age range among the cohorts reveals that the SLS are several years younger when debuting as victims and offenders. Central tendencies of age seem to suggest that both cohorts start as offenders before becoming victimised, as the mean and median age of onset offending is younger than the onset of victimisation for both cohorts.

	VICTIM		OFFENDER	
	SLS	NON-SLS	SLS	NON-SLS
AGE: MEAN	22.4	26.6	21.6	21.9
AGE: SD	6.1	10.7	6.3	7.3
AGE: MEDIAN	21.0	23.5	20.2	20.2
AGE: RANGE	8.5 - 56.5	13.0 - 69.0	8.5 - 56.5	12.4 - 68.6

Table 6: Central tendencies of onset of offending and victimisation

4.5 Crimes with a higher risk of being followed by suspicion of a lethal shooting

The last section in this chapter reports the results of the last sub-question, which also emanate from the third research question. The sub-question asks, "*Does any crime or combination of crimes, as committed or victimised, have a higher estimated risk of being followed by a shooting with a lethal outcome?*". The short answer is yes; several forest plots are used to visualise the results of this sub-question. Forest plots will only present the findings to crime codes where the sample size consists of 26 persons or more, N represents the sample size from which the OR were calculated. Two YouTube videos were referenced for creating the forest plots². Corresponding tables with exact values for each forest plot can be found in **Appendix E**.

Data extraction resulted in mixed sample sizes among the crime codes, as visualised in Table 4. A total of 114 out of 1,440 possible victimisations crime codes were observed. However, no crime code amassed the sample size of 26 persons or more needed for analysis and, therefore, will not be presented further. The sample of offending crime codes was larger, with 309 out of 1,440 crime codes observed. Only 7 per cent (N=22) of the crime codes amassed a sufficient sample size for further analysis. Most of these attained an OR of more than 1.0, and two attained an OR under 1.0. Only 11 crime codes had an OR above 1.0 and a lower CI that did not cross the 1.0 line. Only these 11 crime codes and their combinations are analysed further.

The results are presented in Figure 1. All crimes with an "+" are abbreviations (Abbreviations were used when the names/descriptions were too long to fit in the forest plots). The full names of all abbreviations can be found in **Appendix E**. The findings show that the OR ranged from 5.4 to 1.7, with <u>0337</u> *Attempted Homicide*+ achieving the highest OR of 5.4 with a broader range within the CI compared to <u>5011</u> *Use of Illegal Substance*, which also

² <u>https://www.youtube.com/watch?v=nGuDa9f5sYk & https://www.youtube.com/watch?v=gD9r3tAZK60&t=1s</u>

attained the lowest OR of 1.7. The CI for all subsequent crimes after <u>5011</u> Use of Illegal Substance and 5121 Money Laundry cross the 1.0 line.



Figure 1: Forest plot of singular crimes

The findings show a mixed palette of crime codes across varying crime categories. The crimes could arguably be described to cover various behaviours involving mixed levels of aggression, while other crimes imply a different offender profile, such as <u>0930</u> *Temporary Criminal Fencing* and or <u>3171</u> *Minor Traffic Violation*.

Many of the 11 crime codes could be combined further, resulting in different combinations where the OR increases as the sample size decreases. This led to a decreasing

population of crime codes that could be analysed across all generations of combinations. Table 7. shows the number of combinations of crime codes with an OR above 1.0, which lower CI remain above 1.0.

Table 7: The distribution of crimes or combinations which OR does not cross the 1.0 line

LEVEL	N OF OR
One crime code	11
Crime code + crime code	21
Pair of two crime codes + crime code	11
Triad of three crime codes + crime code	4
Quartet of four crime codes + crime code	0

Figure 2. (below) depicts the forest plot for crime code pairs. The crimes with high OR were cross-referenced with the 22 initial crime codes, resulting in 35 combinations of increased risk, of which 21 had a lower CI that did not cross the 1.0 line.

The combination of <u>0940 & 5011</u>, which attained the highest OR of 5.4, describes someone suspected of *Extortion* and *Use of an Illegal Substance*. Once again, the highest observed OR comes with a wide range within the CI. The pair of <u>5010 & 3002</u> reached the lowest OR of 1.7, describing an offender suspected of *Possession of Illegal Substances* and *Driving without a License*. All lower CI of subsequent pairs and four prior pairs (<u>5005 & 3002</u>, <u>5121 & 5011, 5010 & 1706</u> and <u>5011 & 4023</u>) cross the lower 1.0 line.





Figure 3. (below) depicts the combination of crime code triads. A total of 22 calculations were conducted, which resulted in the identification of 11 triads in which the lower CI did not cross the 1.0 line. The OR of the triads is once again higher than the unique crime codes.

The triad with the highest OR of 4.9 consists of <u>0940 & 5010 & 5011</u>, an individual suspected of *Extortion*, *Possession of Illegal Substance* and *Use of Illegal Substance*. The triad has a wide range within the CI but not the biggest observed. The triad with the lowest OR of 1.7 is a combination of <u>5010 & 5011 & 3070</u>, representing an offender suspected of *Possession of an Illegal Substance*, *Use of an Illegal Substance* and *Driving under the Influence of an Illegal Substance*. The lower CI of the subsequent triads and four prior triads (<u>5010 & 5011 & 5011 & 5121</u>, <u>3002 & 5010 & 5005</u>, and <u>5010 & 5010 & 1705</u>) cross the 1.0 line. The OR of the triads is once again higher for the OR of the unique crimes.



Figure 3: Forest plot of triads of crime codes

Figure 4. (below) depicts the combination of crime code quartets. A total of nine calculations were conducted, which resulted in the identification of four quartets whose lower CI does not subceed 1.0. The lowest OR quartet of <u>5010 & 5005 & 5011 & 3070</u> amassed an OR of 2.2. This describes a person suspected of *Possession of an Illegal Substance*, *Distribution of Illegal Substance*+, *Use of Illegal Substance*, and *Driving under the Influence of an Illegal Substance*. The highest OR of 4.5 consists of a combination of <u>5011 & 0357 & 5010 & 5005</u> describing an individual suspected of *Use of Illegal Substance*, *Assault outdoors*+, *Possession of Illegal Substance*+. Further, as the precision in describing an offending profile increases with an increasing OR, the sample size also decreases.



Figure 4: Forest plot of quartets of crime codes

4.5 Summary

This chapter has provided the findings of the research questions. The demographic characteristics of the SLS and the comparison cohorts show homogeneity, although the SLS are younger on almost all age measurements. The same could be said for the onset of victimisation and offending. Both cohorts start as offenders, but the SLS debuted earlier as victims. A total of 11 out of 1,440 crimes experienced as an offender have a higher risk of being followed by a lethal shooting. The OR ranged from 1.7 (5011) to 5.4 (0357), while the sample sizes varied from N=28 (3171) to N=270 (5011). This gave a base for exploring the estimated risk of different combinations of crimes. This could be conducted down to combinations of four different crime codes with a large enough sample for analysis. Overall, each combination identified a higher risk of being followed by a lethal shooting.

The next chapter will contextualise and discuss the findings. They will be viewed in relation to current research, relevance to policy, the possible practical uses of the findings and their inherent limitations will be examined, as well as the implications for future research.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

The previous chapter presented the main findings of the three research questions and their subquestions. This chapter will discuss the possible implications and limitations of these findings in four sections.

The first section will contextualise the findings, considering prior research on offenders who commit shootings with lethal outcomes. The second section will discuss the possible policy implications for proactive and reactive crime prevention. The third section will assess what gaps remain to be addressed by future research, and the last section will discuss the limitations and fragilities of the design that advocate caution in interpreting the results.

5.2 Theoretical implication

This section will cover the theoretical implications of the findings in relation to previous research. The search conducted for the literature review failed to unveil any Swedish or European research on offenders who have used firearms with lethal outcomes in gang contexts. The literature review was adjusted, and widened, to encompass overlapping themes. As such, the findings in this thesis, to the best of the authors knowledge, arguably provide the first academic description of this cohort. The findings of the first research question offer the first known calculation of the number of suspects of lethal shootings, SLS, that also constitutes *Cylinder nominees* (CN).

The findings of the second research question show that Swedish CN SLS have unique demographic characteristics compared to similar European and Swedish groups. The average age of the Swedish SLS is several years younger than gang members in Europe (Van Koppen et al., 2010; Francis et al., 2013) and Sweden (Rostami et al., 2012; Rostami et al., 2018; Mondani & Rostami, 2022b; Nilvalll, 2021). The same holds for HO in Europe (Salfati and

Canter, 1999; Krüsselmann et al., 2023) and Sweden (Sturup & Lindqvist, 2014; Caman et al., 2017; Khoshnood et al., 2020). Four viable explanations could be that; 1) the CN SLS are younger than other cohorts, 2) the population demographics have shifted over time, 3) the measurements of age are un-comparable as they are conducted at different points in time among the persons studied, or 4) the groups described are inherently different meaning that a synthesis or comparison is not meaningful. Interestingly, the only study to compare homicidal gang members to non-gang members found that the surveyed American gang members were similar in age to the Swedish CN SLS (Adams & Pizarro, 2014). The sample was, however, small and unrepresentative.

The Swedish CN SLS consist of male offenders to a greater extent compared to European members of organised crimes (Van Koppen et al., 2010) and gangs (Francis et al., 2013) as well as Swedish gang members (Rostami et al., 2018; Mondani & Rostami, 2022b). The uniqueness is also observed in comparison to HO in Europe (Salfati and Canter, 1999; Krüsselmann et al., 2023) and Sweden (Sturup & Lindqvist, 2014; Caman et al., 2017; Khoshnood et al., 2020). It must be noted that the differences in the gender variable are smaller; most offenders of any group covered within the literature review are male. Still, no other cohort can match the Swedish proportion of male offenders at 99.6 per cent. Further, the population characteristics described in Table 1. support the idea that the Swedish CN SLS are a unique cohort compared to other Swedish Street gang populations.

Country of birth is the only demographic variable in which the findings regarding the Swedish CN SLS can be placed within an existing range. This is consistent in comparison with European members of organised crime (Van Koppen et al., 2010) and gangs (Pedersen, 2018) and Swedish gang members (Rostami et al., 2012; Rostami et al., 2018; Mondani & Rostami, 2022b) as well as HO in Europe (Salfati and Canter, 1999; Pedersen, 2018; Krüsselmann et al., 2023) and Sweden (Sturup & Lindqvist, 2014; Caman et al., 2017).

This third research question explored if any patterns of prior experiences, detectable within police data, proceed shootings with lethal outcomes. The reason for conducting such an open-ended scan was to incorporate the current knowledge of predictive risk factors for gang membership and HO. General Delinquency (Thornberry et al., 2002; Calderoni et al., 2022) and Violent Delinquency specifically (Krohn and Thornberry, 2007; Higginson et al., 2018) were re-occurringly found to be associated with an increased estimated risk for gang membership. These ranged from a history of offending with violence, drug crimes and weapon crimes (Loeber et al., 2005) to encompassing other crime categories, such as property crimes, as well as distinguishing between different severities of violence (Farrington et al., 2012) and experiences of victimisation beside offending (Shumaker and McKee, 2001). This thesis collected data on prior victimisation but failed to amass the sample size needed for analysis. The lack of data could be explained by the two cohorts within this thesis: 1) not having been victimised or 2) not having reported victimisation. Shumaker and McKee (2001) used several sources besides police data when they found that victimisation also meant a higher risk of a subsequent homicide. Police data could be too insensitive or inefficient for measuring victimisation within this cohort.

The existing European and Swedish literature does not uniformly survey prior experiences of criminality. When surveyed, different experiences of prior offending appear to be associated with an increased estimated risk than those mentioned above, such as *Fraud* (Van Koppen et al., 2010; Francis et al., 2013) and most commonly *Violent Offending* (Lehti and Kivivuori, 2012; Sturup & Linqvist, 2014; Caman et al., 2017; Khoshnood et al., 2020; Khoshnood et al., 2023). The American study, which compared homicidal gang members to non-gang members, found that *Drug Crimes* were most common before the homicides (Adams & Pizarro, 2014). This thesis similarly identifies a diversity of crime codes across different crime categories that, when analysed, indicate an estimated greater risk of being followed by a

shooting with a lethal outcome. These are generally consistent with prior research; weapon crimes concerning firearms and knives have been observed before, as well as assault and drug crimes (Loeber et al., 2005; Farrington et al., 2012). There are, however, several crimes within these findings that have not been observed in the reviewed literature, such as *Attempted Homicide*, *Extortion*, *Illegal Threats*, *Temporary Criminal Fencing* and *Minor Traffic Violations*. The findings regarding the OR of the pairs, triads and quartets of crime codes are also unique in the context of the reviewed literature.

The third research question also explored the different onset ages of the two cohorts. The SLS debuted earlier as both victims and offenders. This can be compared to findings in Denmark, that gang members have an earlier onset age than non-gang members (Pedersen, 2018), and in the UK, the earlier onset, the more experiences of victimisation and offendings are amassed (Dobash et al., 2007).

In sum, the current literature does not efficiently describe the current Swedish CN SLS. Indeed, the most significant similarities to the cohort regarding the demographic characteristics are not found among the different constellations studied within the current literature but rather with the non-SLS cohort. Luckily, experiences of prior offending differ among the CN SLS and non-SLS and are analysable with calculations of OR. The following section will explore the possible policy and practical implications of these findings.

5.3 Policy implications

The policy implication of the findings for the first question provides a fair evidential base upon which future targeting policy within local districts for reducing shootings with lethal outcomes can be approached, sanctioned and authorised. Just under half of all shootings with lethal outcomes are conducted by individuals reported as CN. The findings regarding the demographic characteristics grant two points of clarity; *firstly*, it contributes with a unique survey of any European or Swedish SLS who also arguably hail from a street gang milieu; *secondly*, it shows that the CN SLS cohort is close to identical the CN non-SLS cohort. Thus, organisational policies framed and introduced to better target potential SLS within the CN cohort cannot be based on purely demographic characteristics.

The findings to the last sub-question could facilitate targeting precision. The targeting of a group to reduce lethal shootings among few of its members is not novel. A local adaption of a Group Violence Intervention in the city of Malmö has been conducted, evaluated, and dubbed a success with a monthly reduction of gang-related shootings from 2,8 to 2.3 (Ivert & Mellgren, 2021). The definition and inclusion criteria of "criminal groups" were extensive and ultimately based on professional judgment and treatment was given to an unspecified number of recipients (Ivert & Mellgren, 2021). Similar interventions could perhaps be improved by targeting high-risk offenders, as estimated risk for lethal shootings evidently is not spread equally, at least not among CN, which conduct just under half of all lethal shootings. Reducing the number of individuals receiving an intervention and avoiding over-policing is arguably a sensible usage of public resources that resonates well with the ideals of evidence-based and just-right policing (Sherman, 2022).

If the policy implications of the findings of the second research question are of a more limited nature, the opposite could be claimed for the result of the third. The finding that 11 unique crime codes and 29 possible combinations have an increased estimated risk of being followed by a shooting with a lethal outcome is potentially very valuable. The quest for identifying strategic crimes that precede a prolonged criminal career is well-trodden in Sweden. BRÅ have conducted three cohort studies with this intention, coming to mixed results regarding different crimes that seem to imply an elevated risk of preceding a chronic criminal career (BRÅ, 2000; BRÅ, 2011; BRÅ, 2021c). The studies are tailored toward identifying those who commit many crimes, not necessarily serious, crimes. The findings in this thesis, however, generate such knowledge.

The findings that the estimated risk increases as crime codes are combined provide important knowledge of the necessity of scanning broadly to detect harmful developments in the CNs' criminal careers that might imply an increased risk. It actualises the necessity of engaging taking substantial steps toward data-driven and evidence-based targeting that systematically can be tested and refined. The crime codes with a consistent heighted estimated risk of being followed by a shooting with a lethal outcome, and their combinations, can automatically be scanned, provided the IT-infrastructure was constructed for the cause. Such scanning can be routinised to establish a proactive and systematic scanning of all local individuals who commit high-risk crimes, which could be targeted accordingly. This scanning could be conducted on-demand as front-line police officers sometimes interact with street gang members, such as CN, as often as weekly or daily (Kinnå & Lekare, 2020) provided they had the tools for it. Data driven targeting could facilitate the move from reactive to proactive policing through coordinating the national allocation of police resources towards areas where high-risk individuals routinely spend time instead of areas where shootings recently have occurred. Possessing knowledge of who has an increased risk of committing a lethal shooting would arguably provide a greater possibility of hindering such an act.

If automation is not possible, then IT tools for manual assessment could be constructed. Developing such a tool for structured and reactive assessment would mean that any Swedish police officer could conduct such assessments at any time since the Swedish Police have access to register data of prior offending. In a prototype state, such a tool could be constructed in Microsoft EXCEL using =IF formulas and programmed to return the OR with an explanation of the meaning. This could then be copied and pasted into a report to social services if the CN is juvenile and provide an outset for designing interventions within the field of Social Work. All Swedish officials are legally obliged to report any concerns regarding deficient child welfare (Socialtjänstlagen, 2001), such as their involvement in criminality or constellations of criminals.

A significant advantage of the findings relates to the study design and the fact that the findings are constructed using the current Swedish crime codes. The results provide precise knowledge of which crime codes are associated with an increased risk. For instance, the Swedish crime category of Violent Crimes contains 355 unique crime codes. The findings constitute precise knowledge of which of these *are* associated with a higher risk of being followed by a shooting with a lethal outcome (0337 and 0357) compared to the 353 crime codes that are *not*.

5.4 Research implications

This thesis contributes novel and valuable knowledge regarding CN SLS. But some discoveries remain to be unearthed. This section will explore possible ventures for future research that would supplement and enrich the findings of this thesis and fill the remaining gaps. These will be articulated around three themes: *contextualising* the current findings, *replicating* the method, and *supplementing* the findings.

The recommendations based on 'contextualising' the current findings revolve around the knowledge gaps regarding the CN SLS cohort. As previously discussed, this thesis is the only known research to provide insight into the subset of SLS reported as CN. Therefore, it provides much-needed evidence for the assumption that a large proportion of the shootings with lethal outcomes that now plague Sweden are performed by persons who have been identified as hailing from Vulnerable Neighbourhoods. The result grants clarity but also raises questions about the other 269 SLS who are not CN. They share different demographic characteristics at the cohort level (as visualised in Table 2.) but what can be learned from *their* prior experiences?

Are they similar or different to CN SLS? It is impossible to assess the uniqueness of the CN SLS experiences without comparison to non-CN SLS. There is an opportunity for future researchers to attempt to bridge this gap and provide better evidence, in the sense of distinguishing all SLS more clearly and producing evidence that could further contextualise the initial contributions offered by this research. Generating evidence that could augment reducing SLS independently of the 'shooter', reported as a CN, is both warranted and meaningful. One advantage of further research efforts could be the opportunities to disregard the concept of CN. The fact that CN are identified bi-annually limits their usefulness for targeting purposes, as conflicts most likely emerge more often and unscheduled. Other scholars within the research community could seek to replicate the research methods used in this thesis but utilising alternative comparison groups? Another research possibility would be to study another subset of SLS than CN, such as members of organised crime as determined by intelligence departments across other policing jurisdictions and agencies. It is beyond the scope of this thesis to provide a complete description of the method for identifying members of organised crime through the various intelligence agencies. Broadly, it may differ in terms of inclusion criteria, which cannot be based solely on professional judgement; it demands a degree of connectivity between suspicion of severe crime and an observation linking an offender to another person involved in a serious crime³.

The recommendation for further research focused on future 'replication' is logistically realistic and feasible as it entails the replication of this study when a larger dataset would be available. One possibility would be to collect all CN SLS from 2018 to 2023 or to compare the current sample to the updated list of CN. An increase in the two datasets used to answer the research question in this thesis could provide enough mass to generate stronger or weaker results. Table 11. in **Appendix C** shows that increasing the comparison cohort size is possible

³ As described in personal correspondence with co-workers within the intelligence agency.

and could reduce selection bias (Altman, 1991). Another consideration for this strategy would be to go to further lengths to retrieve missing data from restricted cases. The unique case number can be extracted for these individuals, while case managers for these cases could be contacted with a request to submit the missing data. Increasing the sample could also allow for surveying different subsets, which the present thesis did not explore.

The final recommendations revolve around future 'supplementation' of the findings. One such enterprise would be to explore the temporal aspects of OR crimes and combinations of crimes. Such research would be beneficial in not only establishing what crimes are associated with a higher risk of being followed by a shooting with a lethal shooting. It could also clarify the timeframe from occurrence to shooting. Another dimension to future research could be exploring whether relationships exist between the OR and the time to shooting. If so, it would provide two-dimensional data regarding who to target and when. Another future possibility is to make greater use of the data available. The current thesis does not take full advantage of the extracted data of all experiences, as it contains multiple accounts of re-offendings. Could these experiences, perhaps analysed with a random forest calculation, provide a more detailed description of high-risk criminal careers that could estimate potential shooters more precisely? The findings of the second and third research questions advocate the necessity for including comparison groups when trying to distil unique characteristics. Since this thesis has an exploratory and observational methodology, it cannot provide explanations for the findings. Future research could address these and possibly generate findings that could help develop proactive interventions before risk factors emerge. Equally, academics have emphasised that several risk factors probably interplay before gang membership (Thornberry et al., 2002; Klein & Maxson, 2006; Krohn & Thornberry, 2007; Higginson et al., 2018; Calderoni et al., 2022) and homicide offending (Loeber et al., 2005; Farrington et al., 2012) occurs; future research could investigate the interactions of these diverse risk factors in a Swedish context.

Lastly, caution is warranted regarding the interpretation or assumption that the CN constitute street gang members. While the persons identified using the *Cylinder Method* arguably could qualify as street gang members using the Eurogang Projects definition as their context bears a resemblance to street gang milieus, that notion is neither explicitly entertained nor rejected by the Swedish Police. Caution is thus warranted towards uncritically adopting this interpretation, especially when taking into consideration the existing plethora of definitions of gangs and gang memberships within academia. Future research could address this by providing a means for transforming the *Cylinder Method* into an evidence-based practice. The list of CN contains over 13,000 individuals. Future research on this cohort could perhaps identify objective parameters for inclusion to supplement or replace the current practice of nomination based on professional judgment. An evidence-based nomination process would increase the objectivity of any research conducted on the cohort.

5.5 Limitations

This thesis set out to gather evidence that could be useful in assisting the Swedish police in reducing lethal firearm-related violence. Whilst many aspects of this research are unique, the study is not without limitations. Data limitations and coding implications have already been highlighted; therefore, this section will cover other more limitations that have emerged or surfaced during this complex research undertaking. Steps that have been taken to minimise or mitigate the limitations will also be described. Broadly, the known limitations could be categorised as *lack of detail & diversity, objectivity*, and *replicability*.

The limitations regarding the 'lack of detail and diversity' relate to the research questions and the presentation of the findings. All suspicions and victimisation experienced by the CN SLS and CN non-SLS between 2018 and 2022 are compiled into one dataset. No regard is given to potential subsets within the two cohorts that could house additional variations, misinterpretations, or discrepancies. Are offenders of a certain age less or more experienced in certain crimes? Do those born abroad have different experiences than those born in Sweden? Are individuals who hail from certain areas more representative in the statistics than others? Aggregation of the available data was progressed to assemble sufficient data that could then be analysed. Indeed, only 11 out of 1,440 crime codes scanned amassed a sufficient sample size with which to undertake meaningful analysis. Still, subsets could exist within the sample that could have varying degrees of risk estimations.

The limitations regarding the 'lack of objectivity' are closely tied to measurement validity. For a measurement to be valid, it would need to be both *reliable*, as in showing the same value if replicated and *accurate*, as in not just showing the same value when replicated but also the correct value (Spigelhalter, 2019). Measurement validity may be compromised regarding the sample and the comparison. *Firstly*, the process of identifying and categorising persons that cause local distress, the Cylinder Method, has been perceived as problematic by practitioners (Seton, 2020) and subjective from an outside view (Puur et al., 2019; Gerell et al., 2022), which led to the recommendation that the police develop more objective measurements by the Riksrevisionen (Riksversionen, 2020), the Swedish equivalent to the UK Home Office. There is no guarantee that two districts would assess the same person similarly. This affects the criminal career code the CN SLS have for which the matching has been made and compromises the integrity matching on the criminal career code. Table 11. in Appendix C was created to visualise the number of potential matches from which matches randomly were made. Criminal career codes were used for matching to ensure that the experiences of the SLS cohort were as similar as possible to the non-SLS. However, there are no guarantees that the assessments of the criminal career codes would be the same if replicated since they are based on professional judgment or involve the same level of exposure to confounding variables. Secondly, alot can happen in a district between the bi-annual assessments; people move and grow up, and criminal careers flare and wane. This raises concern over the accuracy of the persons on the list that the *Cylinder Method* produces. Therefore, a person's inclusion in the list is also influenced by *when* the list was created. The central tendencies of age and gender distribution for all SLS and all CN were tabulated in Table 1. to provide some means of comparison. The demographic characteristics identified in this thesis differ somewhat from those found by Nilvall (2019). Still, there is no way to guarantee that the list is accurate according to the practitioners who initially designed and introduced it; there is no guarantee that the persons this thesis reviews within the Cylinder list constitute a stable, unique, and demarcated group. Equally limiting, the thesis cannot answer if an SLS occurred before or after a person was considered a CN.

The limitation relating to 'replicability' is derived from the data used to answer the third research question. The cause of these limitations relates to the legal time limits for which the police can store data in their system and the dynamic nature of police investigations. All known occurrences of offending and victimisation were extracted to answer the parts of the third research question. The data available for extraction is, however, dependent on the age and status of the information as well as the purpose of the prolonged storage (Polisdatalagen, 1998). The extracted data is also examined, near in time to the occurrences. Suspicions and victimisations that have occurred historically can be reported to the police at any time. In a sense, one can say that the data is "alive", and its properties can therefore mutate and morph. A new investigation might therefore find different results. This thesis has aimed to present the data extraction and management as transparently as possible to facilitate replications. Another aspect of replicability is hidden within the findings relating to country of birth. The thesis solely and onedimensionally reports the proportion of CN SLS and non-SLS born abroad. The fact that almost half of both cohorts are born abroad could hide a potential history of offending and victimisation that is not detectable using Swedish police data. Further, being classified as 'suspected of a crime' is largely a determination informed by professional judgment. Suspicions can surface during an investigation. Investigations that have been going on for a longer time should (theoretically) have had more time to amass more suspicions. As such, the extracted history of offending and victimisation could be different if the same extraction was replicated for the same persons a year later. In short, there are no guarantees that a replicated extraction would yield the same result.

In sum, the findings within this thesis must be handled with caution. This thesis is the first instance of CN SLS being compared to non-SLS. This is the case regarding the demographic characteristics and the history of offending and victimisation. Studies that have been replicated are less likely to show variability in the results because of introduced biases or involuntary influences of their designers (Bryman, 2018), even if some degree of variability is to be expected in social sciences (Ariel et al., 2021). Many of the limitations of this study could be addressed if the research conducted in this thesis were replicated. Until then, however, the findings must be interpreted with a degree of caution.

5.6 Summary

This chapter has discussed the findings presented in the previous chapter. The findings have been reviewed for their possible implications and limitations. This thesis presents the first known survey of CN who become SLS. While the CN SLS cohort seems largely unique compared to other constellations in the literature, it is nearly identical to non-SLS who also are CN. The theoretical findings of the third research question are discussed. While there are resemblances to the reviewed literature, it seldom provides the same level of detail regarding particular crimes as presented in the current findings.

The relevant policy implications were discussed; they primarily revolve around the possibility of improved targeting. The findings grant two valuable reference points: targeting future SLS *is not* possible based on demographic characteristics but *is* possible through

scanning police data of specific crime codes. This establishes the necessary infrastructure for both proactive and reactive scanning for reducing lethal firearm-related violence.

However, the research design adopted within this thesis has several limitations. These revolve around issues such as missing data, interpreted data, and lack of objectivity associated with creating a dataset based on subjective parameters. Some findings also lack detail and may obscure subsets or behaviours that would be even more efficient to scan.

Finally, the implications for future research were discussed. These involve recommendations for future research that would contextualise, strengthen, and develop the findings in this thesis. The last chapter will conclude and summarise this thesis by revisiting its core ambitions and purpose.

CHAPTER SIX: CONCLUSION

Lethal shootings have escalated in The Kingdom of Sweden (Sweden) in recent years (Polisen, 2023a). Corresponding escalation has not been observed in Scandinavia (Khosnood, 2019) nor in Europe (BRÅ, 2021b). Some academic advancements have recently been made, which provide insight and a greater understanding of this developing phenomenon. Lethal shootings tend to cluster in local areas that the police have identified as Vulnerable Neighbourhoods and to a greater extent Open Drug Scenes or local places where drugs are used or sold (Gerell et al., 2021). Shootings also tend to repeat within two weeks in Sweden's three largest cities (Sturup et al., 2018) and emerge in an undulated pattern (Polisen, 2018). The places where they occur have sparked speculation that they stem from members of local street gangs that hail from these areas (BRÅ, 2015; Polisen, 2018; Khoshnood, 2017; Sarnecki, 2022). Little is, however, known of the offenders of lethal shootings. This thesis embraces that research challenge.

This research set out to provide new insight into offenders of lethal shootings in milieus that arguably could constitute street gang contexts. The thesis investigates all suspects of lethal shootings (SLS) between 2018 and 2022 who also have been identified as negatively influencing local areas. These individuals are identified as *Cylinder nominees* (CN) using the *Cylinder Method*, and their influence could arguably be encompassed by the Eurogang projects definition of a street gang: "A street gang (or troublesome youth group corresponding to a street gang elsewhere) is any durable, street-oriented youth group whose identity includes involvement in illegal activity" (Weerman et al., 2009: 20).

Three research questions with six sub-questions were formulated. A literature review was conducted to identify and synthesise overlapping themes as precise research on SLS in street gang contexts was sparse. The identified literature showed variability among the demographic characteristics of the constellations studied. Synthesis was also complicated by the variance among the definitions used to define the populations studied. The review found re-occurring evidence in the international literature that accounts of prior *Violent Offending* precede both gang membership (Krohn & Thornberry, 2007; Higginson et al., 2018) and homicides (Loeber et al., 2005; Farrington et al., 2012), while it also was often stated that no *one* factor alone could predict such an outcome.

This thesis was designed as a case-control retrospective study. The research questions demanded the gathering and assembly of a unique dataset. First, all known SLS were extracted and cross-referenced with every person who ever has been CN. The next step involved identifying the comparison group. This was done based on the CN SLS criminal career code. This code is the product of every *Cylinder Method* assessment undertaken since its operational deployment. All CN individuals have a code consisting of the letters A-D (Gerell et al., 2020b) and X. The final step meant the extraction of data, crime codes experienced as victims and offenders for both cohorts, their dates as well as the genders and countries of birth. Data was managed in preparations for analysis, which consisted of calculations of central tendencies, proportions, odds ratios (OR) and 95 per cent confidence intervals.

Just under half of all SLS are also CN. A significant number of the CN in both cohorts were male, and just under half were born outside of Sweden. The SLS debuted earlier as victims and offenders. The cohorts were otherwise very similar. Surprisingly few, 0.7 per cent (N=11) of all crime codes amassed a sample size big enough for OR calculations of 26 persons or more. All of these were experiences of offending. Some provided a large enough sample size, allowing combinations of up to four crime codes. The combinations saw an increase in the OR compared to the included crime codes' singular OR. The sample size also decreased as the number of crime codes combined increased the OR.

The findings provide evidence that CN SLS are demographically unique compared to similar constellations in Europe. The similarities between the two studied cohorts are so

noticeable that targeting based on the studied demographic variables is extremely difficult. However, the findings that some crime codes and their combinations are associated with an increased estimated risk are new and exciting and open the door for better data-driven targeting. If the correct tools were created, this could be routinely adopted or conducted on demand. Such targeting is transparent and precise and can be tested and refined. The implications for future research are discussed in terms of future ventures that could supplement, enrich, and strengthen the findings and test their robustness. The findings are exciting but intertwined with several limitations. These relate to issues with subjectivity in two major aspects of the units of analysis both relating to arbitrariness and summarised as a lack of determined criteria for being registered as a SLS as wells as a CN. Another limitation lies with the 'live' nature of the data, meaning that it can mutate and change properties, which threatens the reliability of the findings. Further research to replicate and supplement the findings is recommended. The thesis has aimed to present the design and its components as transparently as possible to mitigate these limitations.

This thesis was conducted with the intent of generating evidence that can be operationalised to facilitate the reduction of lethal firearm-related violence in Sweden. The findings offer modest yet positive steps in the right direction. The challenges the police face necessitate innovations that can be tested, evaluated, and tasked. The findings of this thesis could help usher in a new era of evidence-based policing that is both urgent, necessary, and warranted to systematically reduce crimes within Sweden.

REFERENCE LIST

Abt, T. (2019) *Bleeding Out: The Devastating Consequences of Urban Violence-and a Bold New Plan for Peace in the Streets*, Hachette: UK.

Adams, J. J. and Pizarro, J. M. (2014). Patterns of Specialization and Escalation in the 'Criminal Careers of Gang and Non-Gang Homicide Offenders. Retrieved 12th December 2023 from <u>https://journals.sagepub.com/doi/10.1177/0093854813503637</u>

Altman, D. G (1991) Practical Statistics for Medical Research, London: Chapman & Hall.

Ariel, B., Bland, M and Sutherland, A. (2021) Experimental Designs, London: Sage.

Borg, E. and Westerlund, J. (2012) *Statistik för Beteendevetare*, 3rd ed., China: People Printing.

Brottsförebyggande rådet (BRÅ). (2000). Strategiska brott: Vilka brott förutspår en fortsatt brottskarriär. Retrieved 21st November 2023 from <u>https://bra.se/publikationer/arkiv/publikationer/2000-08-02-strategiska-brott.html</u>

Brottsförebyggande rådet (BRÅ). (2011). Strategiska brott bland unga på 00-talet. Retrieved 21st November 2023 from <u>https://bra.se/publikationer/arkiv/publikationer/2012-02-07-</u> strategiska-brott-bland-unga-pa-00-talet.html

Brottsförebyggande rådet (BRÅ), other primary author (2015). Det dödliga våldet i Sverige 1990-2014: en beskrivning av utvecklingen med särskilt fokus på skjutvapenvåldet. Retrieved 12th December 2023 from <u>https://bra.se/publikationer/arkiv/publikationer/2015-12-10-det-dodliga-valdet-i-sverige-1990-2014.html</u>

Brottsförebyggande rådet (BRÅ), other primary authors (2019). Skjutningar i Kriminella Miljöer: En Intervjustudie. Retrieved 12th December 2023 from <u>https://bra.se/publikationer/arkiv/publikationer/2019-02-12-skjutningar-i-kriminella-</u> <u>miljoer.html</u>

Brottsförebyggande rådet (BRÅ), other primary authors. (2016). Kriminella nätverk och grupperingar - Polisers bild av maktstrukturer och marknader. Retrieved 12th December 2023 from <u>https://bra.se/publikationer/arkiv/publikationer/2016-08-23-kriminella-natverk-och-grupperingar.html</u>

Brottsförebyggande rådet (BRÅ). (2021a). Konstaterade fall av dödligt våld: En granskning av anmält dödligt våld 2020. Retrieved 12th December 2023 from <u>https://bra.se/publikationer/arkiv/publikationer/2022-03-31-konstaterade-fall-av-dodligt-vald.html</u>

Brottsförebyggande rådet (BRÅ). (2021b). Dödligt skjutvapenvåld i Sverige och andra europeiska länder, en jämförande studie av nivåer, trender och våldsmetoder. Retrieved 21st November 2023 from <u>https://bra.se/publikationer/arkiv/publikationer/2021-05-26-dodligt-skjutvapenvald-i-sverige-och-andra-europeiska-lander.html</u>
Brottsförebyggande rådet (BRÅ). (2021c). Strategiska brott bland ungdomar på 2010-talet. Retrieved 21st November 2023 from <u>https://bra.se/publikationer/arkiv/publikationer/2021-04-</u>13-strategiska-brott-bland-ungdomar-pa-2010-talet.html

Brottsförebyggande rådet (BRÅ). (2023a). Retrieved 4th November 2023 from: <u>https://bra.se/bra-in-english/home/about-bra.html</u>

Brottsförebyggande rådet (BRÅ). (2023b). Retrieved 4th November 2023 from: https://bra.se/bra-in-english/home/crime-and-statistics/crime-statistics.html

Brottsförebyggande rådet (BRÅ). (2023c). Retrieved 4th November 2023 from: <u>https://bra.se/bra-in-english/home/crime-and-statistics/murder-and-manslaughter.html</u>

Brottsförebyggande rådet (BRÅ). (2023d). Klassificering av brott Anvisningar och regler. Retrieved 12th December 2023 from <u>https://bra.se/statistik/brottkoder---klassificering-av-brott.html</u>

Bryman, A. (2018) Samhällsvetenskapliga Metoder, 3rd ed., Malmö: Liber.

Calderoni, F., Comunale, T., Campedelli, G. M., Marchesi, M., Manzi, D. and Frualdo, N. (2022). Organized crime groups: A systematic review of individual-level risk factors related to recruitment. Retrieved 12th December 2023 from <u>https://pubmed.ncbi.nlm.nih.gov/36913220/</u>

Caman, S., Howner, K., Kristiansson, M. and Sturup, J. (2017). Differentiating intimate partner homicide from other homicide: A Swedish population-based study of perpetrator, victim, and incident characteristics. Retrieved 12th December 2023 from <u>https://psycnet.apa.org/record/2016-25878-001</u>

Dobash, R. P., Emerson Dobash, R., Cavanagh, K., Smith, D. and Medina-Ariza, J. (2007). Onset of offending and life course among men convicted of murder. Retrieved 12th December 2023 from <u>https://journals.sagepub.com/doi/10.1177/1088767907306850</u>

European Union. (2023). Retrieved 4th November, 2023 from: <u>https://european-union.europa.eu/principles-countries-history/key-facts-and-figures/life-eu_en</u>

Farrington, D. P., Loeber, R. and Berg, M. T. (2012). Young men who kill: A prospective longitudinal examination from childhood. Retrieved 12th December 2023 from <u>https://www.ojp.gov/ncjrs/virtual-library/abstracts/young-men-who-kill-prospective-longitudinal-examination-childhood</u>

Francis, B., Humphreys, L., Kirby, S. and Soothill, K. (2013). Understanding criminal careers in organised crime. Retrieved 12th December 2023 from https://www.ojp.gov/ncjrs/virtual-library/abstracts/understanding-criminal-careers-organised-crime

Förordning om den officiella statistiken. (2001). SFS 2001:100. Retrieved 12th December 2023 from <u>https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-2001100-om-den-officiella_sfs-2001-100/</u>

Gardner, M.J. and Altman, D.G. (1986). Confidence intervals rather than P values: Estimation rather than hypothesis testing. Retrieved 12th December 2023 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1339793/

Gerell, M. (2020) 'Paralallela samhälsstrukturer' in M. Gerell, P-O Hallin, K. Nilvall and S. Westerdahl (eds) *Att vända utvecklingen: från utsatta områden till trygghet och delaktighet*, Malmö University Publications in Urban Studies (MAPIUS 26), pp. 147-160.

Gerell, M., Hallin, P-O. and Nivall, K. (2020b) 'Lokal kriminell organisering' in M. Gerell, P-O. Hallin, K. Nilvall and S. Westerdahl (eds) *Att vända utvecklingen: från utsatta områden till trygghet och delaktighet* Malmö University Publications in Urban Studies (MAPIUS 26), pp. 96-108.

Gerell, M., Hallin, P-O. and Nilvall, K. (2020a) 'Kriminella nätverk, gatukultur och våld' in M. Gerell, P-O Hallin, K. Nilvall and S. Westerdahl (eds) *Att vända utvecklingen: från utsatta områden till trygghet och delaktighet*, Malmö University Publications in Urban Studies (MAPIUS 26), pp. 109-124.

Gerell, M., Sturup, J., Magnusson, M.M., Nilvall, K., Khoshnood, A. and Rostami, A. (2021). Open drug markets, vulnerable neighbourhoods and gun violence in two Swedish cities. Retrieved 12th December 2023 from <u>https://www.tandfonline.com/doi/full/10.1080/18335330.2021.1889019</u>

Gerell, M., Puur, M. and Guldåker, N. (2022). Swedish Conditions? Characteristics of locations the Swedish Police label as vulnerable. Retrieved 21st November 2023 from <u>https://portal.research.lu.se/en/publications/swedish-conditions-characteristics-of-locations-the-swedish-polic</u>

Gottlieb, P., Kramp, P., Lindhardt, A. and Christensen, O. (1990). Social background of homicide. Retrieved 12th December 2023 from <u>https://www.ojp.gov/ncjrs/virtual-library/abstracts/social-background-homicide129</u>

Göteborgsposten (GP). (2014). Skjutningarna kostar polisen 81 miljoner. Retrieved 21st November 2023 from <u>https://www.gp.se/nyheter/g%C3%B6teborg/skjutningarna-kostar-polisen-81-miljoner-1.459525</u>

Hallin, P-O. and Westerdahl, S. (2020) 'Utsatta Livsvillor' in M. Gerell, P-O. Hallin, K. Nilvall and S. Westerdahl (eds), *Att vända utvecklingen: från utsatta områden till trygghet och delaktighet* Malmö University Publications in Urban Studies (MAPIUS 26), pp. 22-38.

Higginson, A., Benier, K., Shenderovich, Y., Bedford, L., Mazerolle, L. and Murray, J., (2018). Factors associated with youth gang membership in low- and middle- income countries: a systematic review. Retrieved 12th December 2023 from https://pubmed.ncbi.nlm.nih.gov/37131383/

Howell, J. C. (1999). Youth Gang Homicides: A Literature Review. Retrieved 12th December 2023 from <u>https://journals.sagepub.com/doi/abs/10.1177/0011128799045002003</u>

Hultman, E. and Vikberg, H. (2020). En samhällsekonomisk kostnadsnyttoanalys över det skjutvapenrelaterade våldet i Sverige - och hur den samhällsekonomiska kostnaden för

skjutvapenrelaterat våld påverkas av två framtagna sjukvårdsåtgärder. Retrieved 21st November 2023 from <u>https://www.diva-</u> portal.org/smash/get/diva2:1444860/FULLTEXT01.pdf

Häggström, H. and Brun, H. (2019). Antagonistiska hot och dess påverkan på lokalsamhället: En antologi. Retrieved 12th December 2023 from <u>https://www.fhs.se/download/18.4de5088316deae29189350/1571641866102/Antagnostiska%</u> 20hot%20och%20dess%20p%C3%A5verkan%20p%C3%A5%20lokalsamh%C3%A4llet.pdf

Ivert, A-K, Mellgren, C. and Nilsson, J. (2020). Processutvärdering av Sluta Skjut. Retrieved 12th December 2023 from <u>https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1502155&dswid=4638</u>

Ivert, A-K. and Mellgren, C. (2021). Effektutvärdering av Sluta Skjut. Retrieved 12th December 2023 from <u>https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1536554&dswid=-1157</u>

Khoshnood, A. (2017). The increase of firearm-related violence in Sweden. Retrieved 12th December 2023 from <u>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6197136/</u>

Khoshnood, A. (2018). Firearm-related violence in Sweden–A systematic review. Retrieved 12th December 2023 from https://www.sciencedirect.com/science/article/abs/pii/S1359178918301022

Khoshnood, A. (2019). Holding Sweden hostage: firearm-related violence. Retrieved 21st November 2023 from <u>https://www.tandfonline.com/doi/full/10.1080/20961790.2019.1570665</u>

Khoshnood, A. and Väfors Fritz, M. (2017). Offender characteristics: a study of 23 violent offenders in Sweden. Retrieved 12th December 2023 from https://www.tandfonline.com/doi/abs/10.1080/01639625.2016.1196957

Khoshnood, A., Ohlsson, H., Sundquist, J. and Sundquist, K. (2020). Deadly violence in Sweden: profiling offenders through a latent class analysis. Retrievied 12th December from <u>https://portal.research.lu.se/files/81245007/1_s2.0_S0160252720300625_main.pdf</u>

Khoshnood, A., Ohlsson, H., Sundquist, J. and Sundquist, K. (2023). Firearm-related homicide in Sweden: a latent class analysis of suspected offenders. Retrieved 12th December from <u>https://portal.research.lu.se/en/publications/firearm-related-homicide-in-sweden-a-latent-class-analysis-of-sus</u>

Kinnå, K. and Lekare, A. (2020). Underåriga i periferin av den antagonistiska miljön: Orosanmälningar upprättade av poliser i yttre tjänst gällande den antagonistiska miljön och tillämpat metodstöd. Retrieved 12th December 2023 from <u>http://umu.diva-</u> <u>portal.org/smash/record.jsf?language=sv&pid=diva2%3A1396816&dswid=6647</u>

Klein, M. (2000) 'Resolving the Eurogang paradox' in M. Klein, H-J. Kerner, C. Maxson and E. Weitekamp (eds) *Street gangs and youth groups in the US and Europe*. Retrieved 12th December 2023 from <u>https://link.springer.com/chapter/10.1007/978-94-010-0882-2_1</u>

Klein, M.W. and Maxson, C.L., (2006). Street gang patterns and policies. Retrievd 12th December 2023 from https://ebookcentral.proquest.com/lib/CAM/detail.action?docID=281238&pq-origsite=primo

Krohn, M. D. and Thornberry, T. P. (2007) 'Longitudinal perspectives on adolescent Street Gangs', in Akiva, M. L (ed) *In The long view of crime: A synthesis of longitudinal research*, New York, NY: Springer New York. pp. 128-160.

Krüsselmann, K., Aarten, P., Granath, S., Kivivuori, J., Markwalder, N., Suonpää, K., Thomsen, A.H., Walser, S. and Liem, M. (2023). Firearm Homicides in Europe: A comparison with non-firearm homicides in five European countries. Retrieved 12th December 2023 from <u>https://www.tandfonline.com/doi/full/10.1080/17440572.2023.2211513</u>

Lag om etikprövning av forskning som avser människor. (2003). SFS 2003:460. Retrieved 19th December 2023 from <u>https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/lag-2003460-om-etikprovning-av-forskning-som_sfs-2003-460/</u>

Lehti, M. and Kivivuori, J. (2012). 'Homicide in Finland', in M. Liem and W. Pridemore, (eds) *Handbook of European Homicide Research*, Springer: New York, NY, pp. 391-404.

Liem, M., Ganpat, S., Granath, S., Hagstedt, J., Kivivuori, J., Lehti, M. and Nieuwbeerta, P. (2013). Homicide in Finland, the Netherlands, and Sweden: First findings from the European homicide monitor. Retrieved 12th December 2023 from https://journals.sagepub.com/doi/abs/10.1177/1088767912452130?journalCode=hsxa

Loeber, R., Pardini, D., Homish, D. L., Wei, E. H., Crawford, A. M., Farrington, D. P., Loeber-Stouthamer, M., Creemers, J., Koehler, A. S. and Rosenfeld, R. (2005). The prediction of violence and homicide in young men. Retrieved 12th December 2023 from <u>https://pubmed.ncbi.nlm.nih.gov/16392981/</u>

Magnusson, M-M. (2020). Mapping open drug scenes (ODS). Retrieved 12th December 2023 from

https://www.researchgate.net/publication/342753918_Mapping_Open_Drug_Scenes_ODS

Markwalder, N. and Killias, M. (2011). 'Homicide in Switzerland', in M. Liem, M. and W. Pridemore (eds) *Handbook of European Homicide Research*, Springer: New York, NY, pp. 343-354.

Maxson, C., Curry, D. G. and Howell, C. J. (2002) 'Youth gang homicides in the United States in the 1900s', in L. Winifred and S. H. Decker (eds) *Responding to Gangs: Evaluation and Research*, pp. 107-137. Retrieved 12th December 2023 from <u>https://heinonline-org.ezp.lib.cam.ac.uk/HOL/Contents?handle=hein.agopinions/resgng0001&id=1&size=2&ind ex=&collection=agopinions</u>

MedCalc Software Ltd. (n.d.). Odds Ratio Calculator. Version 22.009. Retrieved 12th August 2023, from <u>https://www.medcalc.org/calc/odds_ratio.php</u>

Melamed, A. and Robinson, J.N. (2019). Case-control studies can be useful but have many limitations: Study design: case-control studies. Retrieved 12th December 2023 from <u>https://pubmed.ncbi.nlm.nih.gov/29916200/</u>

Mondani, H. and Rostami, A. (2022a). 'Samarbete I brott: Organiserad brottslighet I Sverige 1995 – 2015', in A. Rostami and J. Sarnecky (eds) *Det svenska tillståndet, En antalogi om brottsutvecklingen I Sverige*, Studentliteratur, pp. 269-307.

Mondani, H. and Rostami, A. (2022b). Uncovering the degree of criminal organization: Swedish Street Gangs and the role of mobility and co-offending networks. Retrieved 12th December 2023 from

https://www.sciencedirect.com/science/article/pii/S0049089X21001344?fbclid=IwAR3b7b1t 38C4NOYhYU18gphg4347r2wHuaIB1g8OuJ8Llf9XLISxOgMuGAU

Mondani, H. and Rostami, A. (2023). Kriminella på kartan – en ESO-rapport om den organiserade brottslighetens geografi. Retrieved 12th December 2023 from <u>https://eso.expertgrupp.se/rapporter/2023_3_kriminella-pa-kartan/</u>

Nilvall, K., 2022. 'Targeting Offenders or a Can of Worms? Tracking outcomes from implementing the Cylinder method in Sweden'. (Unpublished Master Thesis, Cambridge University)

Nordic Co-Operation. (2023). Retrieved November 4th, 2023 from: <u>https://european-union.europa.eu/principles-countries-history/key-facts-and-figures/life-eu_en</u>

Pedersen, M. L. (2018). Do offenders have distinct offending patterns before they join adult gang criminal groups? Analyses of crime specialization and escalation in offence seriousness. Retrieved 12th December 2023 from https://journals.sagepub.com/doi/abs/10.1177/1477370817751351?journalCode=euca

Polisdatalagen. (2018). SFS 2018:622. Retrieved 1st November 2023 from <u>https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/polisdatalag-1998622_sfs-1998-622/</u>

Polisen (2017). Utsatta områden - Social ordning, kriminell struktur och utmaningar för polisen. Retrieved 12th December 2023 from <u>https://polisen.se/aktuellt/publikationer/?requestId=1600095627292&lpfm.cat=436&lpfm.cat=447</u>

Polisen (2018) Grovt skjutvapenvåld i Region Stockholm 2011 till 2017 Återkopplings-PM 1, A220/207/16 Löpnr 001/2018

Polisen (2021). Lägesbild över utsatta områden, regeringsuppdrag 2021. Retrieved 21st November 2023 from <u>https://edokmeetings.stockholm.se/welcome-sv/namnder-</u> <u>styrelser/socialnamnden/mote-2023-03-21/agenda/bilaga-2-p</u>

Polisen (2023a). Sprängningar och skjutningar - polisens arbete. Retrieved 16th August 2023 from <u>https://polisen.se/om-polisen/polisens-arbete/sprangningar-och-skjutningar/</u>

Polisen (2023b). Retrieved 4th November 2023 from: <u>https://european-</u> union.europa.eu/principles-countries-history/key-facts-and-figures/life-eu_en

Polisen (2023c). Retrieved 4th November 2023 from: <u>https://polisen.se/om-polisen/organisation/</u> Polisen (2023d). Retrieved 4th November 2023 from <u>https://polisen.se/aktuellt/nyheter/2023/februari/polisen-nar-tillvaxtmalet-for-20242025-pa-totalen/</u>

Puur, M., Litbo, S. and Gerell, M. (2019). Slutrapport. Utsatta områden i Sverige och polisens lägesbildsverktyg. Retrieved 12th December 2023 from <u>https://www.diva-</u>portal.org/smash/record.jsf?aq2=%5B%5D%5D&c=39&af=%5B%5D&searchType=LIS T_LATEST&sortOrder2=title_sort_asc&query=&language=sv&pid=diva2%3A1412436&aq =%5B%5B%5D%5D&sf=all&aqe=%5B%5D&sortOrder=author_sort_asc&onlyFullText=fal se&noOfRows=50&dswid=-1999

Regeringen. (2023). Retrieved 4th November 2023 from https://www.esv.se/statsliggaren/regleringsbrev/Index?rbId=23880

Riksrevisionen (2020). Rätt insats på rätt plats – polisens arbete i utsatta områden. RIR 2020:20. Retrieved 12th December 2023 from <u>https://www.riksrevisionen.se/rapporter/granskningsrapporter/2020/ratt-insats-pa-ratt-plats---polisens-arbete-i-utsatta-omraden.html</u>

Rostami, A., Leinfelt, F. and Holgersson, S. (2012). An exploratory analysis of Swedish Street Gangs: Applying the Maxson and Klein typology to a Swedish gang dataset. Retrieved 12th December 2023 from

Rostami, A., Mondani, H., Carlsson, C., Sturup, J., Sarnecki, J. and Edling, C. (2018). Våldsbejakande extremism och organiserad brottslighet i Sverige. Retrieved 12th December 2023 from <u>https://www.iffs.se/publikationer/iffs-rapporter/valdsbejakande-extremism-ochorganiserad-brottslighet-i-sverige/</u>

Salfati, C.,G. and Canter, D. V. (1999). Differentiating stranger murders: Profiling offender characteristics from behavioural styles. Retrieved 12th December 2023 from <u>https://onlinelibrary.wiley.com/doi/abs/10.1002/%28SICI%291099-</u>0798%28199907/09%2917%3A3%3C391%3A%3AAID-BSL352%3E3.0.CO%3B2-Z

Sarnecki, J. (2001) *Delinquent Networks: Youth Co-Offending in Stockholm*, Cambridge University Press.

Sarnecki, J. (2022) 'Våldsutvecklingen I Sverige', in A. Rostami and J. Sarnecky (eds) *Det svenska tillståndet, En antologi om brottsutvecklingen I Sverige*, Studentlitteratur, pp. 23-62.

Scott, D. and Bennett, S. (2021). Gang Violence and Homicide: Do Select Factors that Police Report Contribute to Gang Violence, Specifically Predict Gang Homicide? Retrieved 12th December 2023 from <u>https://www.tandfonline.com/doi/full/10.1080/01639625.2021.2025169</u>

Seton, S. (2021). En del av en helhet: En kvalitativ studie om Polismyndighetens implementering av ett metodstöd mot den organiserade brottsligheten. Retrieved 12th December 2023 from <u>https://umu.diva-</u> portal.org/smash/record.jsf?pid=diva2%3A1526029&dswid=7765

Sherman, L. W. (2022). Goldilocks and the three "Ts": Targeting, testing, and tracking for "just right" democratic policing. Retrieved 12th December 2023 from <u>https://onlinelibrary.wiley.com/doi/full/10.1111/1745-9133.12578</u>

Sherman, L. W. (2013). The Rise of Evidence-Based Policing: Targeting, Testing, and Tracking. Retrieved 21st November 2023 from <u>https://cebcp.org/wp-content/evidence-based-policing/Sherman-TripleT.pdf</u>

Shumaker, D. M. and Mckee, G. R. (2001). Characteristics of Homicidal and Violent Juveniles. Retrieved 12th December 2023 from https://www.researchgate.net/publication/11839519_Characteristics_of_Homicidal_and_Violent_Juveniles

Sjölander, A., Johansson, A., Lundholm, C., Altman, D., Almqvist, C. and Pawitan, Y. (2012). Analysis of 1:1 Matched Cohort Studies and Twin Studies, with Binary Exposures and Binary Outcomes. Retrieved 12th December 2023 from <u>https://projecteuclid.org/journals/statistical-science/volume-27/issue-3/Analysis-of-1-1-</u> <u>Matched-Cohort-Studies-and-Twin-Studies/10.1214/12-STS390.full</u>

Skatteverket. (2023). Personal Identity Number. Retrieved 2nd December 2023 from <u>https://www.skatteverket.se/servicelankar/otherlanguages/inenglishengelska/individualsande</u> <u>mployees/livinginsweden/personalidentitynumbers.4.2cf1b5cd163796a5c8b4295.html</u>

Socialtjänstlagen. (2001). SFS 2001:453. Retrieved 12th December 2013 from <u>https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/socialtjanstlag-2001453_sfs-2001-453/</u>

Spiegelhalter, D. (2019) The Art of Statistics: Learning from Data, UK: Penguin.

Statistiska centralbyrån (SCB). (2023). Population statistics. Retrieved 21st November 2023 from <u>https://www.scb.se/en/finding-statistics/statistics-by-subject-area/population/population-composition/population-statistics/</u>

Sturup, J. and Lindqvist, P. (2014). Homicide offenders 32 years later – A Swedish population-based study on recidivism. Retrieved 12th December 2023 from https://pubmed.ncbi.nlm.nih.gov/24501077/ <u>https://pubmed.ncbi.nlm.nih.gov/24501077/</u>

Sturup, J., Karlberg, D. and Kristiansson, M., (2015). Unsolved homicides in Sweden: A population-based study of 264 homicides. Forensic Science International, 257, pp.106-113.

Sturup, J., Rostami, A., Gerell, M. and Sandholm, A. (2018). Near-repeat shootings in contemporary Sweden 2011 to 2015. Retrieved 12th December 2023 from <u>https://static.sys.kth.se/abe/safeplaces/publikationer/Near-repeat_shootings_Sturup_Gerell_et_al.pdf</u>

Sturup, J., Rostami, A., Mondani, H., Gerell, M., Sarnecki, J. and Edling, C. (2019). Increased gun violence among young males in Sweden: a Descriptive National Survey and International Comparison. Retrieved 12th December 2023 from https://link.springer.com/article/10.1007/s10610-018-9387-0

Suonpää, K., Kivivuori, J., Aarten, P., Ahven, A., Granath, S., Markwalder, N., Skott, S., Tomsen, A. H., Walser, S. and Liem, M. (2022). Homicide drop in seven European countries: General or specific across countries and crime types? Retrieved 12th December 2023 from https://journals-sagepub-com.ezp.lib.cam.ac.uk/doi/full/10.1177/14773708221103799

Sveriges Radio (SR). (2023). Polisens hotellnota under gängkriget – 19 miljoner. Retrieved 21st November 2023 from <u>https://sverigesradio.se/artikel/polisens-hotellnota-under-gangkriget-19-miljoner</u>

Swedish Institute. (2023). Retrieved 12th December 2023 from <u>https://sweden.se/life/society/key-facts-about-sweden</u>

Thornberry, T.P., Krohn, M. D., Lizotte, A. J., Smith, C. A. and Tobin, K. (2002). 'The Antecedents of Gang Membership', in *Gangs and Delinquency in Developmental Perspective*. Cambridge: Cambridge University Press, pp. 56–76.

Trägårdh, K., Nilsson, T., Granath, S. and Sturup, J. (2016). A time trend study of Swedish male and female homicide offenders from 1990 to 2010. Retrieved 12th December 2023 from <u>https://www.tandfonline.com/doi/full/10.1080/14999013.2016.1152615</u>

United Nations (UN). (2001). United Nations Convention against Transnational Organized Crime. General Assembly Resolution 55/25 of 15 Nov 2000. Retrieved August 12th December 2023 from <u>https://www.unodc.org/pdf/crime/a_res_55/res5525e.pdf</u>

United Nations, other primary creator, (UN). (2014). Global study on homicide 2013: Trends, contexts, data. Retrieved 12th December 2023 from https://www.unodc.org/documents/gsh/pdfs/2014_GLOBAL_HOMICIDE_BOOK_web.pdf

Uppsala Universitet (UU). (2023). Skjutvapenvåldet riskerar att stå samhället dyrt. Retrieved 21st November 2023 from: <u>https://www.uu.se/nyheter/arkiv/2023-09-13-skjutvapenvaldet-riskerar-att-sta-samhallet-dyrt</u>

Valasik, M. and Reid, S. (2021). East side story: Disaggregating gang homicides in east Los Angeles. Retrieved 12th December 2023 from <u>https://www.mdpi.com/2076-0760/10/2/48</u>

Van Koppen, M. V., De Poot, C. J., Kleemans, E. R. and Nieuwbeerta, P. (2010). Criminal trajectories in organized crime. Retrieved 12th December 2023 from <u>https://www.researchgate.net/publication/48345145_Criminal_Trajectories_in_Organized_Crime</u>

Weerman, F. M., Maxson, C. L., Esbensen, F., Aldridge, J., Medina, J. and Van Gemert, F. (2009). Eurogang program manual background, development, and use of the Eurogang instruments in multi-site, multi-method comparative research. Retrieved 7th August 2023 from <u>www.escholar.manchester.ac.uk/api/datastream?publicationPid=uk-ac-man</u>scw:58536&datastreamId=FULL-TEXT.PDF

APPENDICES

Appendix A: Key-word chains used for literature searches

This Appendix contains one of the Key-word chains used to identify relevant literature for one of the three themes. Synonyms were grouped in parentheses and combined with OR. Groups were combined with AND. The literature search was conducted from narrow to broad with specific literature being sought after before broader and more general literature that rendered large but unspecific results.

Ν	KEYWORD CHAIN	LEVEL	N	HITS
		REMOVED		23.04.23
1:1	(characteristic*)	NONE	5	8
	(perpetrator* OR suspect* OR offender* OR mafia*			
	OR gang* OR criminal* OR delinquent*)			
	AND			
	(gun* OR firearm OR shoot*)			
	AND (
	killing* OR lethal* OR fatal* OR violenc* OR homicid*			
	OR murder*)			
	AND			
	(Swed* OR Scandinavia*)			
1:2	(perpetrator* OR suspect* OR offender* OR mafia*	(characteristic*)	4	28
	OR gang* OR criminal* OR delinquent*)			
	AND			
	(gun* OR firearm OR shoot*) AND (killing* OR lethal*			
	OR fatal* OR violenc* OR homicid* OR murder*)			
	AND			
	(Swed* OR Scandinavia*)			
1:3	(characteristic*)	(killing* OR lethal* OR fatal* OR	3	284
	AND	violenc* OR homicid* OR murder*)		
	(perpetrator* OR suspect* OR offender* OR mafia*	AND		
	OR gang* OR criminal* OR delinquent*)	(gun* OR firearm OR shoot*)		
	AND			
	(Swed* OR Scandinavia*)			
1:4	(characteristic*)	(characteristic*)	2	47,163
	AND	AND		
	(perpetrator* OR suspect* OR offender* OR mafia*	(killing* OR lethal* OR fatal* OR		
	OR gang* OR criminal* OR delinquent*)	violenc* OR homicid* OR murder*)		
		AND		
		(Swed* OR Scandinavia*)		

Table 8: Example of a Key-word chain

Appendix B: Offender characteristics

This Appendix contains the tabulated demographic characteristics of gang members (Table 9.) and homicide offenders (Table 10.), as well as any crimes found to predate such events when presented as Odds Ratios (OR). The samples are grouped by country in Table 9. and by Modus Operandi (MO) in Table 10.

Highest OR	N/A	raud – Conspire to Defraud 32.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Predictors?	YES	YES F	YES	ON	ON	ON	ON		NO
% Born Abroad	47			58	51.4	41.3	48.1		
% Male	91.8	95	84		94.7	90.4	95.7	95.4	,
Range age		,		15-49	15-84	15-85	15-66		15-75
Mdn age		29		26.0	22.0	23.0	22.0		
SD age		,			7.5	9.6	7.9	6.6	8.0
M age	38	31.7	-	27.2	24.0	26.3	24.6	30.4	27.9
Author	Van Koppen et al 2015	Francis et al., 2013	Pedersen, 2018	Rostami et al., 2012	Rostami et al., 2018	Rostami et al., 2018	Rostami et al., 2018	Mondani & Rostami 2018	Nilvall, 2021
Country	The Netherlands	England & Wales	Denmark	Sweden	Sweden	Sweden	Sweden	Sweden	Sweden
UoA: members of	Organised Crime	Organised Crime	Gang members	Gang members	Street gangs	Criminal Networks	Mafia	Street gangs	Cylinder nominees
z	854	4,109	564	239	5,094	176	486	1,079	4,066

Table 9: Characteristics of gang members

Highest OR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	V/N	N/A	N/A	NONE ABOVE 1.0	N/A
Predictors?	ON	ON	ON	YES	ON	ON	ON	ON	ON	YES	YES	YES	YES	YES	YES
% Born Abroad	3.4	52,2	43,7		37,7	40,2	45,3	37,2	7.2			5	14	50	19.8
% Male	95.6	94.6	95,1	94.9	0.86	86.1	87.3	90.3	8.98	72.0		72.2	16		88.5
Range age				15-60						15-49	14-69			15-72	
Mdn age														29.0	15-60
SD age	15.81	10.58	18.9		16.9	13.13	14.2	14.2	13.85				13.7		
M age	41.98	32.16	45.4	1	36.5	33.52	36.1	34.6	36.8	27.0	27.5	37.0	35.7	1	39.0
Author	Krusselman et al., 2023	Krusselman et al., 2023	Krusselman et al., 2023	Khoshnood et al., 2023	Krusselman et al., 2023	Salfati & Canter, 1999	Dobash et al., 2007	Lehti & Kivivuori,2011	Sturup & Linqvist, 2014	Caman et al., 2017b	Koshnood et al., 2020				
Country	Finland	The Netherlands	Switzerland	Sweden	Sweden	The Netherlands	Switzerland	Sweden	Finland	UK	England, Wales & Scotland	Finland	Sweden	Sweden	Sweden
MO	Firearm	Firearm	Firearm	Firearm	Firearm	Non-firearm	Non-firearm	Non-firearm	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified
Status of HO	Suspects	Mixed/unspecified	Mixed/unspecified	Suspects	Mixed/unspecified	Mixed/unspecified	Mixed/unspecified	Mixed/unspecified	Suspects	Mixed/unspecified	Convicts	Primary Suspects	Convicts	Convicts	Mixed/unspecified
z	206	1,292	223	889	199	2,201	379	1,024	1,022	82	786	691	153	165	14,446

Table 10: Demographic characteristics of HO

Appendix C: Population sizes

This appendix contains a table of the number of SLS and non-SLS within each criminal career group. One group, BBXC did not have any matches.

CRIMINAL	Ν	Ν	CRIMINAL	Ν	Ν
CAREER CODE	SLS	NON-SLS	CAREER CODE	SLS	NON-SLS
AAAA	7	149	CXXX	2	524
AAAX	1	19	DCCC	2	24
AAXA	1	6	DXDC	2	13
AAXX	3	20	DXDD	1	53
AXAA	8	146	XAAA	1	77
AXAB	1	18	XAAB	1	5
AXAX	2	40	XAAX	1	21
AXBA	1	9	XAXX	1	32
AXBB	2	55	XBAA	1	9
AXXA	3	40	XBBB	15	293
AXXX	1	277	XBBX	1	160
BAAA	2	24	XBCB	1	7
BABB	1	10	XBXB	1	2
BBAA	1	18	XBXC	1	1
BBBB	22	466	XBXX	3	123
BBBX	1	85	XCBB	1	30
BBCC	1	19	XCCB	2	33
BBXC	1	**0**	XCCC	7	247
BBXX	3	99	XCCX	2	107
BCCB	1	13	XDDD	1	197
BXBA	1	25	XXAA	4	160
BXBB	11	393	XXAX	1	51
BXBC	1	14	XXBA	3	22
BXBX	3	102	XXBB	34	734
BXXX	7	763	XXBC	3	80
CBBB	3	73	XXBX	7	405
CBXX	2	7	XXCB	3	121
CCBB	3	28	XXCC	10	780
СССВ	1	23	XXCX	1	381
CCCC	4	160	XXDB	1	28
CCCX	2	54	XXDC	2	95
CXBB	5	91	XXDD	6	475
CXBX	2	19	XXXB	6	669
CXCC	3	163	XXXC	14	795
CXCX	1	40	XXXD	4	821
			SUM	258	11,043

Table 11: Number of potential matches within each criminal career group

Appendix D: Formulas used for analyses

This Appendix contains the Formulas used to perform the analyses used in this thesis. Figure 5 and 6 retrieved from Altman, 1991. The formula used in Figure 7 is retrieved from MedCalc (n.d.)

$$OR = \frac{a \times d}{b \times c}$$

Figure 5: Formula used to calculate OR

Operationalised in Microsoft Excel as =(a*d)/(b*d)

$$SE\{\ln(OR)\} = \sqrt{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}}$$

Figure 6: Formula used to calculate the standard error of log odds, SE{ln(OR)}

Operationalised in Microsoft Excel as =LN(OR)

95% CI = exp
$$\left(\ln(OR) - 1.96 \times \text{SE}\{\ln(OR)\} \right)$$
 to exp $\left(\ln(OR) + 1.96 \times \text{SE}\{\ln(OR)\} \right)$

Figure 7: Formula used to calculate the lower and upper CI

Operationalised in Microsoft Excel as: =EXP(ln(OR)+1.96*SQRT(1/a+1/b+1/c+1/d) &

=EXP(ln(OR)-1.96*SQRT(1/a+1/b+1/c+1/d)

Appendix E: Detailed tables for forest plots

This appendix includes tables of the crime codes' full names and detailed values for the forest plots in the Findings Chapter. These include the Odds Ratios (OR) and their upper (UCI) and lower confidence intervals (LCI).

UNIQUE CRIME CODES DESCRIPTIONS	OR	UCI	LCI
0337 (N=30) Attempted. Preparations towards or Conspiracy to commit. homicide. with a Firearm. toward an	10101	0107 71	0.015000
Adult Male. No Kelation between Suspect and Victum	5.451054	14.42195	2.045228
4074 (N=86) Possession of Gun. Revolver or Automatic Riffle	3.542157	5.960842	2.104884
0940 (N=56) Extortion	3.390698	6.379759	1.802079
9447 (N=40) Illegal Threat towards Adult Male. No Relation between Suspect and Victim	2.844498	5.826657	1.388646
0930 (N=36) Temporary Criminal Fencing	2.780087	5.891709	1.311823
3171 (N=28) Minor Traffic Violation	2.626582	6.078034	1.13506
0357 (N=37) Assault. outdoors. towards an Adult Male. No Relation between Suspect and Victim	2.517119	5.210114	1.216075
5005 (N=113) Action with Accomplished Distribution or Facilitation of Distribution of an Illegal Substance	2.260333	3.491351	1.463361
5010 (N=256) Possession of Illegal Substance	2.199589	3.129326	1.546081
4023 (N=74) Unlawful Carrying of a Knife in a Public Place	1.783006	2.956375	1.075341
5121: Money Laundry (N=50)	1.718211	3.128832	0.943563
5011 (N=270) Use Illegal Substance	1.705246	2.418316	1.202434
1709 (N=49) Obstruction of Justice	1.507237	2.740885	0.828843
9810 (N=27) Robbery. without the use of a firearm. towards a non-Elderly nor Disabled Adult	1.484723	3.264791	0.675205
1706 (N=30) Resisting an Arrest	1.329487	2.797122	0.631912
3002 (N=116) Driving Without a License	1.249951	1.892592	0.825523
3070 (N=107) Driving under the Influence of Illegal Substance	1.1799	1.807669	0.770143
1705 (N=40) Threat. Unlawful Disturbance or Harassment towards an Official	1.11463	2.126967	0.584118
9806 (N=27) Robbery. without the use of Firearm. towards a Non-Elderly nor Disabled Minor	1.081355	2.348446	0.497916
0802 (N=30) Temporary and Accomplished Theft of a Vehicle	1.071093	2.215172	0.517901
0853 (N=30) Theft from a Business Establishment without Entering and Breaking	0.65034	1.379348	0.306625
3101 (N=26) Reckless Driving	0.609818	1.370521	0.27134

Table 12: Values for crime codes and their full names.

CRIME CODE PAIRS	OR	UCL	LCI
5011 + 0940 (N=41)	5.445227418	12.52886413	2.366575401
5010 + 0940 (N=40)	5.261479592	12.1303883	2.282133665
5010 + 0357 (N=27)	4.718297872	12.66232316	1.758155634
5005 + 4074 (N=32)	4.708513709	11.64511191	1.90381179
5010 + 4074 (N=64)	4.646751307	8.782331889	2.458606436
5011 + 4074 (N=67)	4.092357724	7.48529437	2.237372495
9447 + 5011 (N=32)	3.848522167	9.067115867	1.633498798
4074 + 3002 (N=33)	3.353987069	7.584802549	1.483127502
9447 + 5010 (N=28)	3.177966102	7.613753524	1.326476949
5011 + 0357 (N=31)	3.059294872	6.974371925	1.341953829
5005 + 4023 (N=26)	2.851140456	6.905427576	1.177190234
5010 + 0930 (N=29)	2.769597458	6.374287165	1.203376923
5010 + 5005 (N=90)	2.6003663	4.225244951	1.60035808
5011 + 5010 (N=206)	2.355925325	3.383490887	1.640431235
5011 + 0930 (N=26)	2.344142259	5.492929262	1.000377516
5010 + 4023 (N=50)	2.296524664	4.275458917	1.233557762
5011 + 5005 (N=96)	2.204311153	3.502180788	1.387417713
5005 + 3070 (N=41)	2.03757764	3.982781319	1.042417925
5121 + 5010 (N=38)	2.022546419	4.048073185	1.010528671
5005 + 3002 (N=42)	1.893913043	3.651450304	0.982323821
5121 + 5011 (N=39)	1.870381773	3.68655982	0.948941059
5001 + 1706 (N=27)	1.749583333	3.897896589	0.785306067
5010 + 3070 (N=83)	1.740746359	2.815219689	1.07636285
5011 + 4023 (N=60)	1.711067194	2.971725175	0.985202456
5010 + 1709 (N=37)	1.706043956	3.395330772	0.857231939
5010 + 3002 (N=87)	1.704008074	2.728228249	1.064296404
5011 + 1709 (N=39)	1.661802575	3.246672604	0.850590169
5011 + 1705 (N=32)	1.498383969	3.102199691	0.72372985
5010 + 1705 (N=29)	1.446180556	3.09273319	0.676242686
5011 + 3070 (N=102)	1.342666667	2.076441367	0.868193924
4023 + 3002 (N=37)	1.340307203	2.631679292	0.68
5011 + 3002 (N=99)	1.318069307	2.047993441	0.848297003
4023 + 3070 (N=26)	1.176268861	2.594939525	0.533194867
5011 + 0802 (N=30)	1.152341434	2.41302876	0.550300437
5010 + 0802 (N=26)	1	2.201170291	0.454303787

Table 13: Values for crime code pairs

CRIME CODE TRIADS	OR	UCI	LCI
0940 & 5010 + 5011 (N=38)	4.8988622	11.34409889	2.115536112
0357 + 5011 + 5010 (N=26)	4.484745763	12.08581284	1.664178059
4074 & 5005 + 5010 (N=29)	4.111823362	10.27634041	1.645244386
5010 & 5011 + 4074 (N=58)	3.984034833	1.382295083	2.092356068
3002 & 5010 + 4074 (N=27)	3.722457627	9.383275796	1.47674342
0930 & 5011 + 5010 (N=26)	2.344142259	5.492929262	1.000377516
5005 & 5010 + 5011 (N=82)	2.319398607	3.81580812	1.409821911
4023 & 5010 + 5011 (N=46)	2.212979351	4.207691368	1.163887077
3070 & 5005 + 5010 (N=37)	2.200071839	4.481026078	1.080180301
5010 & 5011 + 5121 (N=33)	2.093617021	4.412428657	0.993383139
3070 & 5005 + 5011 (N=41)	2.03757764	3.982781319	1.042417925
3002 & 5010 + 5005 (N=37)	1.933311324	3.887108126	0.961561283
5010 & 5011 + 1705 (N=27)	1.749583333	3.897896589	0.785306067
5010 & 5011 + 3070 (N=83)	1.740746359	2.815219689	1.07636285
5005 & 5011 + 3002 (N=40)	1.738505747	3.380453725	0.894081824
3002 & 5010 + 5011 (N=84)	1.584256891	2.547455537	0.985245811
3002 & 5010 + 4023 (N=28)	1.584090909	3.452184853	0.726885759
1709 & 5010 + 5011 (N=35)	1.544491525	3.108936139	0.767289505
3002 & 5010 + 3070 (N=56)	1.498835404	2.631938503	0.853556253
3070 & 5005 + 3002 (N=29)	1.446180556	3.09273319	0.68
5010 & 5011 + 0802 (N=26)	1	2.201170291	0.454303787

Table 14: Values for crime code triads

CRIME CODE QUARTETS	OR	UCI	LCI
5011 & 0357 & 5010 + 5005 (N=26)	4.484746	12.08581	1.664
5011 & 5010 & 4074 + 5005 (N=27)	3.722458	9.383276	1.477
5010 & 3002 & 4074 + 5011 (N=27)	3.530239	8.942426	1.477
5010 & 5005 & 5011 + 3070 (N=37)	2.200072	4.481026	1.08
5010 & 5005 & 5011 + 3002 (N=36)	1.844839	3.7275	0.913
5005 & 3070 & 5010 + 3002 (N=26)	1.639834	3.685407	0.73
5010 & 3070 & 3002 + 5005 (N=26)	1.498835	2.631939	0.854
5010 & 4023 + 5011 + 3002 (N=27)	1.484723	3.264791	0.675
5005 & 3070 & 5011 + 3002 (N=29)	1.446181	3.092733	0.676

T 1 1	1 .	371	C	•	1	
Table	15:	Values	tor	crime.	code	quartets
1 4010	10.	, and op	101	••••••	0040	quarters