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Changing Types of Homicide in Scotland and their Relationship to Types of Wider Violence

Sara Skott

PhD

School of Law

The University of Edinburgh

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Declaration

I declare that this thesis was composed entirely by me, based on my own work, with acknowledgement of other sources, and has not been submitted for any other degree or professional qualification.

Sara Skott

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Abstract

The lack of information about the relationship between homicide and violence was identified as a gap in knowledge almost 30 years ago. Despite this, little research has been conducted worldwide regarding this relationship on a national level since then, and the results of that research have been very contradictory. This lack of research includes Scotland, despite its unenviable reputation of being the most violent country in the Western world. Even so, many studies make unsupported assumptions regarding the relationship between the trends in homicide and wider violence. In order to fill this gap in research, the aim of the thesis is therefore to examine the changing characteristics and patterns of homicide in Scotland and to determine the extent to which changes in homicide reflect the changing characteristics and patterns in wider violence.

Overall, both homicide and violence have more than halved over the past twenty years in Scotland. But this is not just a numbers game. Due to the heterogenous nature of these crimes, although the overall picture is one of decline, there might be certain types of homicide and violence that have remained stable, or even increased over this time. In order to examine the relationship between homicide and violence in Scotland, subtypes of both homicide and violence were identified and compared over time. Two datasets were used in the current study; a homicide dataset gathered from the Scottish Homicide Database, spanning from 1990-2015, and a violence dataset gathered from pooled survey sweeps of the Scottish Crime and Justice Survey, spanning from 2008-09 to 2014-15. Multilevel latent class analysis was used to identify subtypes of both homicide and violence using classifying variables relating to the victim, offender and to the incident of lethal and non-lethal violence. This study presents the first use of this type of multilevel latent class analysis in all criminological research.

The results identified four main types of homicide (*Stabbing homicides*, *No Weapon-bludgeoning homicides*, *Rivalry homicides* and *Femicides*) and four main types of violence (*Domestic*, *Public No Weapon*, *Public Weapon*, and *Work-related*). When the homicide typology and the violence typology were compared over time it was found

that although there are some differences in the subtypes identified, the overall trends in these two crimes seem to follow a similar pattern over time. A key finding from this study is that the general decrease in both homicide and violence was driven by a reduction in the same type of violence, namely violence committed by young men in public places and involving the use of sharp instruments. However, this general decrease in violence masks a hidden relative increase in both lethal and non-lethal forms of domestic violence over time.

This thesis will argue that the trends in homicide and violence indeed do follow a similar pattern over time, but that an overall picture of decline does not mean that all types of violence or homicide are decreasing equally. This has vital implications for violence policy. Improved and specific prevention strategies are needed for certain types of lethal and non-lethal violence, such as domestic violence, in order to ensure that all types of violence are prevented equally. This study will also make important theoretical contributions, in that all theories making assumptions about the trends in homicide and violence should examine disaggregated subtypes of these crimes in order to provide a holistic explanation of the changes in these crimes. Limitations of the study are discussed as well as future implications of these findings for policy and theory.

Chapter 1: Introduction

‘So many of the violent young men I have encountered were not making the conscious decision to choose violence. For them violence was their *only* choice. It’s the only response they know.’ (Carnochan, 2015, p. 102).

Violence, both lethal and non-lethal, has traditionally been a serious problem in Scotland. This deep-rooted problem dates back decades and has been particularly centred around knife violence and gang violence, especially in the west part of Scotland (Carnochan, 2015; Damer, 1990; Fraser, 2015). Problems of violence and gang-related crime was documented as early as the 1920s and 1930s (Davies, 2007), and in the late 1980s, certain suburbs of Glasgow had more than fifty territorial youth gangs fighting at their boundaries with a wide array of weapons, most commonly knives or sharp instruments (Carnochan, 2015). The late 1980s and early 1990s also saw a huge increase in drug abuse in Scotland, particularly around Glasgow, as well as problems of widespread unemployment which contributed to the violence and gangs emerging in areas of multiple disadvantage (Fraser, 2015; Orr, 1997). Serious assault peaked in 1987 with 6 989 crimes reported to the police, an increase of 142% since 1976, and in 1995-96, a peak of 134 homicides was recorded, which was an increase of 91% compared to the levels twenty years earlier (Scottish Government, 2014d; 2016d). Evidence suggest that, at this time, young people were carrying knives as a way to protect themselves, and the constant nature of this fighting made violence in Scotland seem both normalised and inevitable (Carnochan, 2015).

This has changed, however. Over the past ten years, homicide has decreased dramatically in Scotland, with 2015-16 demonstrating the lowest numbers since 1976 (Scottish Government, 2016d). All other violent crimes, with the exception of sexual violence, have demonstrated a marked decrease over this time as well. This coincided with the reframing of violence as a public health problem, with the implementation of intervention strategies advocating multiagency collaboration such as work done by the Violence Reduction Unit (VRU, 2016). Over the last decade, Scotland has gone from

being ‘one of the most violent countries in the Western World’ (BBC News, 2005; The Guardian, 2005) to having one of the lowest homicide rates in Europe (Eurostat, 2017).

Although this is great news for Scotland, this is more than just a numbers game. There are many aspects relating to homicide and violence that remains unknown. Harries (1989) identified the lacking knowledge regarding the relationship between homicide and violence as a gap in violence research almost 30 years ago. Although we know that both homicide and violence have decreased in Scotland over time, we still do not know the nature of the relationship between these two crimes. We do not know whether there are different types of homicide and violence or whether similar types can be identified across lethal and non-lethal incidents. We do not know whether these types of homicide and violence have decreased equally over time. Despite a general decrease in homicide and violence, there might be certain types of homicide and violence which have remained stable or even increased over time. We therefore do not know if this overall decrease in lethal and non-lethal violence in Scotland in fact obscures hidden countertrends in the data. Finally, we do not know whether the change in homicide types reflect the change in types of wider violence or if types of lethal and non-lethal violence demonstrate different patterns over time.

Overall, this means that there is an overall lack of understanding of homicide and violence, how these two crimes relate to each other, and how they have changed over time. This lack of knowledge is problematic for a number of reasons. Firstly, homicide and violence have profound implications regarding stress placed on emergency systems, as well as the health of the family and community (Harries, 1989). Lack of knowledge about homicide and violence means lacking understanding of the exact impact these crimes have on society and the people in it. Secondly, any policy intervention aimed at reducing lethal and non-lethal violence is less likely to be effective since this requires a deeper understanding of the characteristics and patterns of homicide and violence. Thirdly, evaluations of previous as well as current policies aimed at reducing homicide and violence are less likely to be reliable due to this lacking knowledge. Fourthly, any theoretical claims involving homicide and violence

needs to be based on a full understanding of the characteristics, changes, and the relationship between these two crimes, which is currently lacking.

There are consequently important implications of the lacking knowledge of homicide and violence in Scotland relating to policy as well as theory. This is a problem which needs to be examined further if these two crimes are to be understood.

1.1 Aim and research questions

There are four major objectives of this thesis. Firstly, to examine the characteristics of homicide and violence in order to identify types of these crimes. Characteristics refer to variables relating to the victim, offender and incident, while types are defined as the identified profiles of these characteristics of both homicide and violence, respectively.

The second objective is to analyse the changing pattern in both homicide and violence trends by examining how the identified types of lethal and non-lethal violence have changed over time. Trends are defined as the change in homicide or violence over time, while the patterns of these trends are defined as the direction and magnitude of that change.

The third objective is to compare the identified types of homicide and violence in order to establish whether there are any similarities between lethal and non-lethal types. Whether or not similar types of homicide and violence can be identified is important in order to establish the nature of the relationship between these two crimes. If similar types of homicide and violence can be identified, this would suggest that homicide can be regarded as the extreme end of a violence spectrum. This would mean that the lethality of a violent act can be assessed, which has important implications for prevention strategies as well as theoretical implications for understanding the relationship between these two crimes. If similar types of homicide and violence would not be identified, this would imply important differences between the characteristics of these two crimes that might suggest something qualitatively different about the act of homicide compared to wider violence.

The fourth objective is to examine whether the types of lethal and non-lethal violence have changed similarly over time. Whether or not the trends in homicide and violence are following a similar pattern over time is highly relevant for understanding the decline evident in these two crimes in Scotland. If the trends in violence have not followed a similar pattern to homicide over time, this would suggest that the factors which affected one trend did not seem to affect the other. This in turn has important implications for policy since homicide and violence might require different prevention strategies. Conversely, if the trends in homicide and violence do follow a similar pattern over time, the changing trends in homicide could be used to monitor the changing trends in violence. Homicide is generally considered a more robust measurement with a lower dark figure compared to other crimes, which are not reported to or recorded by the police as often (Brookman, 2005; Granath, 2011; Haen Marshall & Summers, 2012; Tonry, 2014). This means that we generally know more about homicide compared to other violent crimes which have a higher dark figure. By using trends in homicide as a barometer for the trends in wider violence, more information about the changing patterns in violence could be obtained. This would have great advantages for the police in increasing the efficiency when directing resources to prevent as well as tackle lethal and non-lethal violence.

Trends in homicide and violence are often assumed to follow a similar pattern over time since homicide is considered to constitute the extreme end of a violent spectrum (Brookman & Maguire, 2003; Fajnzylber, Lederman & Loayza, 2002; Harries, 1989; Harris et al., 2002; Sampson, Raudenbusch & Earls, 1997; Van Wilsem, 2004; Zimring, 1968). As will be argued in the following thesis however, neither the relationship between the characteristics of homicide and violence, nor the relationship between the trends in these two crimes have previously been established due to conflicting evidence. We do not know if homicide and violence are following a similar pattern over time, and we do not know if there are certain types of homicide or violence which follow a different pattern than the overall trend. As mentioned, there might be certain types of homicide or violence which have remained stable or might even be increasing over time. It is vital to examine this if homicide and violence are to be understood, as well as if the level of lethal and non-lethal violence in Scotland is to

remain at its record low. If certain types of homicide and violence are not decreasing, these types need to be identified in order for any violence policy to be effective.

These four objectives will help to provide a deeper understanding of the relationship between homicide and violence in Scotland over time. The term relationship in the current study is therefore defined as a) the similarities and differences between the characteristics of homicide and violence, and b) the similarities and differences in the trends between these two crimes.

In order to examine this relationship, it was decided to examine homicide in the context of wider violence, meaning that the primary focus of this study is on homicide. This means that while subtypes of violence will be examined, this will be done as a comparison to the subtypes identified of homicide. There are two main reasons why homicide has a primary position in the study: firstly, homicide is generally considered to be one of the most reliably measured crimes with a comparatively low dark figure (Brookman, 2005). As mentioned, this means that more is known about this crime compared to other violent crimes. Secondly, the SHD dataset measures all homicides committed in Scotland over the relevant time period that came to the attention of the police, essentially making it a population dataset. Additionally, the homicide dataset required a large amount of data management before it could be used, whereas the violence dataset did not (see section 4.3 in Chapter 4). It therefore made more strategic sense to adapt the violence data to fit the homicide data than the other way around. For these reasons, more time and space will be given to the homicide data throughout the study and the primary focus of the study will be homicide, contextualised in wider violence.

The aim of the current thesis is therefore to examine the changing characteristics and patterns of homicide in Scotland and to determine the extent to which changes in homicide reflect the changing characteristics and patterns in wider violence. To fulfil this aim, the following research questions will be answered:

- 1) What subtypes of homicide with similar characteristics can be identified?

- 2) What subtypes of wider violence with similar characteristics can be identified?
- 3) How has the mix of homicide subtypes changed over time?
- 4) How has the mix of violence subtypes changed over time?
- 5) How does the change in homicide subtypes reflect the overall change in violence subtypes, if at all?

The following section will define and expand on some of the terms used here and throughout this thesis.

1.2 Definition of terms

When conducting research about any crime, the exact definitions and boundaries of that crime are important. The same is true for homicide and violence. The homicide data was gathered from the Scottish Homicide Database (SHD) and a homicide case for the purposes of this study was defined as an incident where at least one dead body (or parts of a dead body) was found within the context of the same crime scene which the police considered to be a murder. The homicide case may involve multiple offenders and/or multiple victims but if another victim was found outside the borders of the first crime scene, this would be regarded as another homicide case. Similarly, if an offender was involved in multiple homicides over time, these would be regarded as different cases. The term homicide is used interchangeably with the term lethal violence throughout this thesis.

The homicide data in the current study only included cases which Police Scotland had classified as murders, meaning that culpable homicides were excluded from the data. A crime is defined as murder when the offender has acted with the intention of killing the victim or where the conduct of the offender has been 'wickedly reckless' (Scottish Government, 2004b). In contrast, the crime is defined as culpable homicide when the offender has caused the loss of life through wrongful conduct without the intention to kill or 'wicked recklessness'. A crime can also be considered culpable homicide if diminished responsibility (such as provocation) can be found (Scottish Government, 2004b). It was decided to exclude culpable homicides since this included cases where the death did not result from the act of another person, such as for instance the self-

administration of drugs. The rationale behind this decision was that these types of cases do not always include a violent act and is therefore less comparable to a violent crime that did not end lethally.

Violence, used interchangeably in this thesis with the terms wider violence and non-lethal violence, is defined as any violent act which did not end in the death of the victim. The current study uses data from the Scottish Crime and Justice Survey (SCJS) to measure violence, and this includes any incident which the victim themselves identified as violence and chose to report in the survey. Violence, as defined here, also includes sexual violence.

The term disaggregated crime refers to crimes (such as homicide and violence) which have been divided into types. Disaggregation therefore refers to the process of identifying subtypes of homicide or violence in the data. Aggregated crime, in contrast, refers to all cases of homicide or violence, without any types.

The following section will outline the structure of the thesis as well as how each of these five research questions will be answered.

1.3 Structure of the thesis

The current thesis consists of three main sections. The first section consists of Chapter 2 and Chapter 3. Chapter 2 provides a review of previous literature and research concerning homicide and wider violence, both internationally and in Scotland, in order to provide a backdrop for this research. This includes a detailed examination of the rates of homicide and violence over time in Scotland. Chapter 3 examines different theoretical perspectives to explain the changing trends in homicide and violence, focusing on two main types of theories: crime opportunities theories and cultural explanations of violence, including the construction of masculinity. Previous and current policies aimed at reducing violence will also be outlined in this chapter in order to examine how the problem of violence has been constructed over time in Scotland. Finally, this chapter reviews previous literature on both homicide and violence typologies in order to identify the most important variables when examining subtypes

of these crimes. Chapter 3 ends with a conclusion of what is known in this particular area as well as outlining the aim and research questions for the current thesis.

The second section contains the data and methods chapters (Chapter 4 and Chapter 5), and provides a description of the datasets used in the study, how the data was coded and the statistical techniques used in the study. Chapter 4 provides a description of the research design as well as a detailed description about the two datasets used in the current study; the SHD and the SCJS. This includes a description of how all data was collected, coded and reshaped in order to answer the research questions of the study. Chapter 5 outlines the statistical methods used to identify subtypes in the current study as well as providing details of how the modelling was conducted.

The third section contains the results and conclusions and is made up of the remaining five Chapters. This final section presents the findings of the research, answering the research questions, as well as providing a discussion of these findings based on the theoretical framework and previous research outlined in the first section. The final Chapter, outlines the limitations of the study and future directions for research, and ends with a final summary of the thesis.

1.3.1 Answering the research questions

Since no previous study has examined the relationship between homicide and violence in Scotland, or the relationship between subtypes of homicide and violence anywhere for that matter, an exploratory approach was taken. It was important to maintain an inductive, exploratory approach since this meant that the analysis was data-informed rather than limited by any previous theoretical ideas about typologies. This means that new, previously unidentified subtypes could be identified which was of interest due to the lacking knowledge in this field. The five research questions outlined in the previous section were therefore not to be considered hypotheses to be tested or falsified but as tools to help fulfil the overarching aim of the thesis.

The subtypes of homicide were identified using a probabilistic clustering technique called Latent Class Analysis (LCA) in order to answer the first research question (see

Chapter 5). Single-level LCA modelling was initially conducted on the victim, offender and incident variables of homicide separately (see Chapter 6) before a multilevel LCA model was run on the entire homicide sample (2000-2015) using all these variables across time in order to identify a typology of homicide in Scotland (see Chapter 7). This meant that a homicide typology was modelled using victim, offender and incident variables simultaneously even though the homicide offenders were nested in the homicide cases since any given case could include more than one offender. The choice of classifying variables was based on the variables identified as important in previous research (see Chapter 3), and data availability. Although the data contained in the SHD stretches back to 1990, the quality of data varied over time. In order to make the data more reliable, only data from 2000 and onwards was subjected to the multilevel LCA modelling (see Chapter 4). All details of the modelling and statistical methodology are provided in Chapter 5.

This procedure was then repeated for the SCJS violence data in order to address the second research question (see Chapter 8). Reported victimisation for serious assault and sexual assault was grouped together before the whole violence sample was submitted to multilevel LCA modelling. Sexual violence is almost always differentiated from non-sexual violence in crime statistics due to the differing nature of the two crimes. However, homicide cases in the SHD (and in other sources of homicide statistics) include both sexual and non-sexual homicides. Since part of the study aim was to determine the extent to which homicide reflects the changing characteristics and patterns in wider violence in Scotland, it would arguably be misleading to only compare the change in homicide with the change in non-sexual violent crimes. In order to avoid an incomplete comparison and to make the two data sources more comparable, sexual violence was therefore included alongside non-sexual violence in the current thesis.

The classification variables chosen for the LCA of violence was as similar to the LCA of homicide as the data allowed. Due to variable and coding inconsistencies in the sweeps of the SCJS over time however, only five sweeps could be included in the violence dataset covering the time period between 2008-09 and 2014-15. Despite the

differences in time periods between the homicide data and the violence data, it was still considered worthwhile to compare the typologies for two main reasons. Firstly, trends in subtypes of homicide and violence has never been compared before. Any information given from this research would therefore be useful. Secondly, despite the fact that the two datasets are different, extensive measures have been taken in order to maximise their comparability, including the recoding of the variables used and the modelling of the datasets. It is therefore the position of the researcher that this analysis would contribute to the understanding of these two crimes, regardless of these shortcomings.

The changing profile of the homicide subtypes over time was examined in order to address the third research question (see Chapter 9). Using time as a covariate in the model, the change in homicide subtypes was examined over time, enabling the examination of the pattern and characteristics of homicide cases over time, taking all 16 years examined into account (see Chapter 9). This was then repeated with the violence data in order to provide an answer for the fourth research question and to examine the changing profile of violence subtypes over time (see Chapter 9).

The change in the homicide subtypes was then compared to the change in the violence subtypes over time in order to answer the fifth research question (see Chapter 9). This comparison was conducted theoretically and not by the use of any statistical technique. In line with the third and fourth major objectives outlined above, the latent classes of homicide and violence were firstly compared in order to examine whether similar types of lethal and non-lethal violence could be identified. Secondly, the distribution and change in these types were compared over time in order to determine the extent to which changes in types of homicide reflect the changing pattern and characteristics in types of violence in Scotland. All findings and conclusions are drawn together in the final Chapter of the thesis, which also includes a discussion of the limitations as well as future directions for research (see Chapter 10). The next section will provide an overview of the argument made in the current thesis.

1.4 Overview of argument

This thesis makes eight key arguments. Firstly, it is argued that knowledge about the relationship between homicide and wider violence is lacking and that this is problematic. There is also a lack in research about homicide and violence in Scotland, despite the importance of this type of crime historically and the major changes in trends over the past two decades. Secondly, this thesis argues that in order to get a deeper understanding of the relationship between homicide and violence, two key elements of this relationship needs to be examined: the characteristics of homicide and violence in terms of variables relating to the victims, offenders and incidents; and the changing pattern in both homicide and violence trends. Thirdly, it is argued that in order to examine those two key elements, homicide and violence need to be disaggregated into types. Recent research has underlined the heterogenous nature of both homicide and violence (Blumstein, 2000; Lehti, 2014; Messner & Savolainen, 2001; Roberts & Willits, 2015; Thompson, 2015), suggesting that examining aggregate trends of these crimes would lead to erroneous results. It is therefore argued that subtypes of homicide and violence should be identified and then compared over time in order to examine the relationship between homicide and violence.

Fourthly, this thesis will argue that homicide is related to wider violence in that similar types of lethal and non-lethal violence are identified and the types demonstrate a similar pattern in trends over time. Fifthly, this thesis will furthermore argue that although all types of homicide and violence are decreasing in absolute terms, some types, such as lethal and non-lethal domestic violence, have demonstrated a relative increase over time. The examination of the aggregate trends of homicide and violence does not tell the whole story. It is, sixthly, therefore argued that any theoretical perspective analysing homicide and violence should disaggregate these crimes in order to provide accurate theoretical explanations. Seventhly, it is also argued, in line with Cooney (2003), that both lethal and non-lethal violence have become more privatised over time, with more violent acts being committed in private rather than public settings. It is argued that in the context of this privatisation of violence, these findings could be understood as symptomatic of a *Vertigo of Masculinity*, where violence (both

lethal and non-lethal) becomes an expression of perceived powerlessness in a time of ontological uncertainty in regards to masculinity.

The final key argument of the thesis concerns the implications for policy of the current findings. It will be argued that many of the interventions implemented in the mid-2000s when violence was framed as a public health problem, such as the work done by the Violence Reduction Unit (VRU, 2016), are likely to have helped in reducing public violence and homicides occurring between young men. However, due do to the relative increase in lethal and non-lethal domestic violence evident over time, despite many policy interventions aimed at reducing this type of violence, this thesis will argue that future interventions should focus on tackling the cultural and social issues related to violence in order to be able to keep preventing and reducing all types of homicide and violence.

1.5 Original contribution

This thesis makes original contributions to several different areas of research, including the study of trends in homicide and violence, research concerning typologies of homicide and violence and to theories and policies regarding lethal and non-lethal violence. Firstly, this is the first study to examine types of homicide and violence based on profiles of characteristics relating to the victims, offenders and the incidents of these two crimes in Scotland. Secondly, this is the first study to examine how these types have changed over time. Thirdly, no previous study has used Multilevel LCA to identify subtypes of either homicide or violence, and no other study has examined how these subtypes have changed over time. As will be demonstrated in the current study, this technique is immensely useful for identifying subtypes or latent patterns in the data and it is encouraged that this technique is used more in the future. The benefits of using multilevel modelling of this kind is that hierarchical structures in the data, such as homicide offenders being nested in homicide incidents and violence victims being nested in violent incidents, are taken into account. This does not only increase the appropriateness and accuracy of the results, but the relevance and reliability as well. This is also the first instance in which multilevel LCA modelling has been used in this way in the field of criminology, and the first instance of non-parametric multilevel

LCA modelling being conducted with weighted survey data. This study therefore provides a unique perspective on crime trends research, arguing that any research examining lethal and non-lethal violence over time should disaggregate these trends. Fourthly, this thesis will contribute to typology research by providing a more nuanced as well as multifaceted typology of homicide and violence using this technique. Fifthly, this thesis provides some original theoretical contributions around homicide and violence. This thesis has argued that different types of lethal and non-lethal violence change differently over time and any theory which attempts to explain these changes should take this difference into account in order to provide a holistic explanation. The concept of a *Vertigo of Masculinity*, where both lethal and non-lethal violence is conceptualised as an expression of perceived powerlessness in a time of ontological uncertainty in regards to masculinity, is furthermore an original theoretical concept for this study.

Sixthly, this thesis provides contributions to policy. Since homicide and violence are argued to follow a similar pattern over time, similar policies could be used to tackle both homicide and violence. This thesis has also contributed to policy by arguing that different types of homicide and violence needs to be tackled differently. Although homicide overall might not require a specific policy, certain types of both lethal and non-lethal violence, such as domestic violence or violence in the work place, do need to be targeted specifically since these different types of lethal and non-lethal violence are demonstrating different trends over time. Finally, this research will provide insights into the Scottish context in relation to violence and homicide, where this topic had been previously under-researched.

As the quote by John Carnochan (2015), the co-founder of the Violence Reduction Unit (VRU, 2016) at the beginning of this Chapter suggests, the problem of homicide and violence in Scotland is a cultural problem, and although the decrease in homicide and violence evident over the past ten years is good news, this decline needs to be examined further if we want to gain a deeper understanding of the characteristics and change in these two crimes. This thesis will take the first steps towards such an

examination, beginning with the review of previous research and literature in the next Chapter.

Chapter 2: Previous Research and the Scottish Context

2.1 Introduction

As mentioned in the introductory chapter, there is a gap in research relating to the relationship between homicide and violence. There is furthermore a gap in the research relating to homicide and violence overall in Scotland. The aim of this chapter is therefore to examine previous research relating to the relationship between homicide and violence, looking specifically at two aspects of this relationship: the similarities and differences between the characteristics of homicide and violence; and the similarities and differences between the trends in these two crimes over time. Firstly, previous research about these two aspects of the relationship between homicide and violence will be examined, mapping out the gaps of this research before studies about homicide and violence conducted specifically in Scotland will be examined. It will be argued that Scotland was chosen for this research for three main reasons: firstly, the relationship between homicide and violence has never been examined in Scotland; secondly, Scotland has previously been described as one of the most violent countries in the developed world, despite the lack of research on violence conducted in this country; and finally, Scotland has very rich sources of data which has seen limited use. In combination, these reasons make Scotland a perfect case study country for the research of this thesis.

Implications of the lacking research about the relationship between homicide and violence will then be discussed. This will be followed by a closer examination of the trends in homicide and wider violence in Scotland using statistics from the Scottish Government. Police recorded homicide will be compared to police recorded violence as well as victimisation measures of violence. It will be argued that homicide and non-sexual violence appear to follow a similar pattern over time, but that both of these crimes must be disaggregated in order to be fully understood.

This Chapter will begin by examining previous research about the relationship between homicide and wider violence.

2.2 The relationship between homicide and violence

Homicide, as the most serious of violent crimes, has devastating consequences not only for the victim, but the victim's family, friends and the community as a whole. Yet, the understanding of how homicide relates to wider violence, is lacking. Almost 30 years ago, Harries (1989) identified the lacking knowledge regarding the relationship between homicide and violence as a gap in violence research. Harries argued that knowledge was lacking in two aspects of this relationship: qualitative aspects, such as information about the similarities in characteristics of homicide and violence; and quantitative aspects, such as information about the similarities in the temporal patterns of these two crimes. This lack of knowledge meant that it had not yet been established whether homicide and wider violence can be viewed as similar behaviours only differentiated by the outcome (Harries, 1989).

As will be explained, this lack of understanding is problematic for a number of reasons. Not only would prevention strategies and policies to tackle violence and homicide be more efficient with this knowledge, but theoretical insights could also be gained through a deeper understanding of how homicide relates to wider violence in regards to these two aspects outlined by Harries (1989). Little research has been conducted regarding these two aspects of the relationship between homicide and violence since then, however. Although Harries (1989) examined the relationship between more short-term temporal patterns of homicide and violence (such as seasonal similarities and differences), information about long-term temporal similarities between these two crimes is needed as well. The following two sections will therefore outline previous research regarding the similarities and differences between characteristics of homicide and violence and the similarities and differences between the change over time in these two crimes. The subsequent sections will also describe the implications of this lacking knowledge and why it is important to examine these aspects further.

2.2.1 Characteristics of homicide and violence

Although scholars assume a relationship between homicide and violence on the intuitive level (Harries, 1989), very few studies have examined the similarities and differences between characteristics of homicide and violence in order to establish

whether these two crimes reflect the same underlying behaviour. Harries (1989) examined this aspect of the relationship between homicide and violence and found that while homicide and violence differed on some variables, such as the use of firearms (which was more common in homicides) and the location of the crime (homicides were more likely to occur in residential settings compared to violence) the characteristics of homicide and violence were very similar. Harries concluded that due to the demographic and temporal similarities between these two crimes, homicide and violence should be regarded as the same underlying behaviour, differing in outcome rather than process.

When comparing lethal and non-lethal intimate partner violence, Addington and Perumean-Chaney (2014) however found a more complex relationship between homicide and violence. While domestic homicides of male victims were very similar to non-lethal domestic violence of male victims, suggesting an underlying continuum of violence, domestic homicides of female victims were different from non-lethal domestic violence against female victims. This suggested that the characteristics of homicide and violence were distinct and could not be interpreted along the same continuum (Addington & Perumean-Chaney, 2014).

Despite the scarcity of studies examining the similarities between the characteristics of homicide and violence, many studies however make assumptions about this relationship. Studies examining the lethality of violence (see for instance Dobash, Dobash, Cavanagh & Medina-Ariza, 2007; Ganpat, Van Der Leun & Nieuwbeerta, 2013) assume an underlying relationship between the two crimes since this type of analysis postulates that the characteristics of the incidents are similar enough to be comparable. Other studies examine homicide and violence separately, with the unavoidable implication that they are two distinct crimes with different characteristics (see for instance Bossarte, Simon & Barker, 2006; Breetzke, 2017). It is therefore important to examine the characteristics of homicide and violence further in order to establish whether these two crimes are related or not.

The following section will examine previous research on the second aspect identified as lacking in the relationship between homicide and violence; the similarities and differences between the change over time in these two crimes.

2.2.2 Trends in homicide and violence over time

The changing trends in violence have been a subject of academic interest for well over a century (see for instance Quetelet, 1842). Substantial increases or declines in violence rates have been considered important social indicators of the functionality of social systems or the effects of major changes in society (Tonry, 2014). Changes in crime trends have more recently received particular attention during the so called 'crime drop' that has been internationally documented during the past two decades (Farrell & Brantingham, 2013). This cross-national decline marked a reversal of a previously increasing trend in violence that was prevalent since the 1950s (Tonry, 2014; Tonry & Farrington, 2005). Although recent research suggest that the crime drop is not universal (Weiss, Renno Santos, Testa & Kumar, 2016) there has been a major reduction in crime in most Western, industrialised countries since the early to mid-1990s, including homicide (Aebi & Linde, 2010; Farrell, Tilley, Tseloni & Mailley, 2010; LaFree, Curtis & McDowall, 2015). This decline in homicide is prevalent in Canada and the U.S as well as in Europe (Farrell & Brantingham, 2013; Haen Marshall & Summers, 2012; Selmini & McElrath, 2014).

Despite this, very little research has been conducted regarding the relationship between the trends in homicide and violence over time. Tonry (2014) found that while homicide has decreased almost everywhere in the Western world, the trends in non-lethal violence differ between countries. In Western Europe, homicide appears to have increased from the 1970s to the mid-1980s before decreasing slightly in the latter half of the 1980s (Haen Marshall & Summers, 2012). Homicide then increased again, peaking in the early 1990s in most Western European countries (Aebi & Linde, 2012). A substantial decline followed, leaving the homicide rate at 24% lower in 2008

compared to 1970¹. Very similar figures of decrease were found in Central and Eastern European countries (24% decrease in 2008 compared to 1985²).

Interpreting the trends in wider violence is however not as straightforward. Violence, both measured by victimisation data and police recorded data, has decreased markedly in English-speaking countries, including the UK, Canada, Australia and the U.S, while the trends have remained stable or increased elsewhere, for instance in Scandinavia (Tonry, 2014). Studies have found that violence has increased since the 1990s in Western Europe (Aebi & Linde, 2010; 2012; Farrell et al., 2010), while other research has suggested that these trends have declined (Blumstein, 2000; Tonry, 2014). Tonry (2014) however argued that this increase in violence is artificial, and mostly due to cultural changes in violence tolerance, police reporting and recording, rather than an actual increase in crime, and that the true story is one of decline. Although these cross-national differences might be due to changes in reporting and recording of crime (Tonry, 2014), these contradictory trends might also indicate that homicide has followed a different trend in comparison to wider violence. This raises important questions about the relationship between the trends in homicide and violence. Can homicide be considered representative of other forms of violence within a country, or does the trend in homicide follow a different pattern?

Studies by Blumstein (2000) and Harris, Thomas, Fisher and Hirsch, (2002) both compared trends in homicide and violence over time in the U.S, and found an inverse relationship between the two crimes. Blumstein (2000) found that while the levels of police recorded homicide had decreased from 1972 to 1998 in the U.S, the levels of police recorded violence had increased by 134% during the same time period. However, when the victimisation rates for violence were examined, Blumstein found that the trends in violence and homicide were very similar, suggesting, similarly to Tonry (2014), that the vast increase in violence might be artificial. Blumstein (2000)

¹ This was based on the geometric mean of the homicide rate per 100 000 people for 15 Western European countries (Aebi & Linde, 2012).

² These figures were based on the geometric mean of the homicide rate per 100 000 people for 12 Central and Eastern European countries (Aebi & Linde, 2012).

speculated that the increases detected in police recorded violence could be due to an increase in the reporting and recording of domestic violence, which previously suffered from major underreporting. Due to changes in public attitudes towards domestic violence, as well as changes within the police and attitudes of victims, more incidents of domestic violence are coming to the attention of the police (Scottish Government, 2015a; Tonry, 2014). Blumstein (2000) therefore argued that the trends in homicide follow a similar pattern to violence over time in the U.S. In contrast, Harris et al., (2002) found that police recorded non-lethal violence had increased dramatically in comparison to homicide since 1960; while violence had increased by 290% between 1960 and 1999, homicide had increased by 12% during the same time period. This would suggest that the trends in homicide are not related to the trends in wider violence over time.

Harris et al., (2002) furthermore examined the relative relationship between homicide and violence by constructing a combined measure of lethality using police recorded crime. This construct measures the fraction of all homicides to all violence including homicide, measured by combining all homicides plus all police recorded violent acts³. Similar measurements have been used in other studies (see for instance Haen Marshall & Summers, 2012). When examining the lethality of violence over time, Harris et al., (2002) found that the lethality rate had dropped from 0.056 lethal incidents per 100 000 people in 1960 to 0.016 per 100 000 people in 1999, a decrease of 28.6%. Although this provides a different perspective on how the trends in homicide relates to the trends in violence over time, as mentioned, the use of a lethality measure already assumes that there is a relationship between these two crimes since homicides are considered to be assaults which ended lethally. This is problematic since the relationship between the trends in homicide and wider violence is yet to be established. The contrasting results found by Blumstein (2000) and Harris et al., (2002), despite using similar data sources over similar time periods, further highlights the lack of knowledge about this relationship.

³ Measured as aggravated assaults (Harris et al., 2002).

Although both Blumstein (2000) and Harris et al., (2002) used statistics from the FBI's Uniform Crime Reports (UCR), which only includes police recorded crime that is submitted on a voluntary basis from law enforcement agencies (FBI, 2015), only Blumstein (2000) compared these findings to victimisation data (the National Crime Victimization Survey). The fact that Harris et al., (2002) did not compare the police recorded crime to victimisation data might be related to the differences between these two studies. Blumstein (2000) also found differences in trends when only police recorded crime was examined, which suggests that the choice of data is highly important when examining the relationship between homicide and violence. Since victimisation data previously has been argued to be more reliable than police recorded crime when measuring violence (Tonry, 2014; Van Dijk, Van Kesteren & Smit, 2007), the vast increase in violence found by Harris et al., (2002) might be due to changes in public reporting and police recording rather than an actual underlying increase in violence. The next section will therefore examine the differences between crime measurements of homicide and violence.

2.2.2.1 Measurements of homicide and violence

Victimisation data has since the 1960s become a more favourable measure of crime due to the many advantages of victimisation measures compared to police recorded data (Maguire, 2012; McAra & McVie, 2012). For instance, victimisation data may include crimes that have not come to the attention of the police, it is less affected by changes in public reporting or police recording in comparison to police recorded crime, as well as changes to coding procedures, and it generally allows the researcher to collect more information about the characteristics of the crime and the victim (McAra & McVie, 2012). Although victimisation measures of crime have shortcomings such as sampling errors or respondents not accurately reporting their victimisation or their criminality, victimisation measures such as crime surveys are considered the most reliable measure of crime (Maguire, 2012; McAra & McVie, 2012).

The advantages of using victimisation data are also evident when examining violence (Tonry, 2014; Van Dijk et al., 2007). Lauritzen, Rezey and Heimer (2015) compared violence measured by victimisation data (National Crime Victimization Survey) and

police recorded crime (Uniform Crime Reports) in the U.S, and found that the victimisation measures of violence were more reliable. Lauritzen et al., (2015) argued that the police recorded violent crime reflected changes in police practices as well as how the police handled and recorded violence, while the victimisation measures of violence more accurately depicted the underlying change in violence.

However, since victims of homicide cannot participate in crime surveys, police recorded crime data is the only measurement available for measuring homicide. Police recorded crime is generally regarded to have a higher 'dark figure' compared to victimisation data since most crimes does not come to the attention of the police (Brookman, 2005; Granath, 2011; McAra & McVie, 2012). Homicide is however considered an exception due to the practical difficulties of hiding the evidence compared to other crimes. Although some homicides never come to the attention of the police, this number is considered to be lower compared to other crimes and homicide is therefore considered to be one of the most reliably measured crimes (Brookman, 2005; Granath, 2011).

Due to these differences, the choice of violence measurement is highly important when examining the relationship between the trends in homicide and violence. Lauritzen et al., (2015) found that victimisation measures of violence and police recorded violence demonstrated opposite trends over time. While victimisation measures of violence had decreased between the early 1970s until the mid-1980s, police recorded violence had increased during this time period (Lauritzen et al., 2015). When Lauritzen et al., compared both measures of violence to police recorded measures of homicide (Supplementary Homicide Reports), they found that the victimisation data was more closely related to homicide trends over time. Hence, like Blumstein (2000), Lauritzen et al., (2015) concluded that homicide and violence followed a similar trend over time when victimisation measures of violence were used, but not when police recorded violence was used.

This difference in violence measurements is also evident in European studies. Aebi and Linde (2010) found that while police recorded homicide had decreased by

approximately 26% in Western Europe from 1990 to 2007, police recorded violence⁴ had increased by 143% in Western Europe during the same time period. When victimisation data from the International Crime and Victims Survey was examined, Aebi and Linde (2010) found a more diverse trend in violence, increasing between 1988 and 1999, before subsequently decreasing slightly until 2004. Despite this, Aebi and Linde (2010) concluded that violence had increased while homicide had decreased in Western Europe.

Contrastingly, Van Wilsem (2004) found that countries with high homicide rates also tended to have high rates of non-lethal violent crimes⁵ measured by victimisation data. This indicates that homicide as a crime could be representative of other forms of violence within a country. Van Wilsem also found that the national levels of homicide only were related to self-reported levels of non-lethal violence, not rates of non-lethal violence reported to the police⁶. Similar to Blumstein (2000), Van Wilsem (2004) therefore argued that homicide rates follow a similar pattern to self-reported victimisation, but were not related to violent victimisation known to the police. Van Wilsem (2004) concluded that homicide can be considered representative of other non-lethal violence across most European countries.

These research results consequently seem to differ depending on the data chosen to measure non-lethal violence. Although trends in homicide appears to follow similar trends to violence measured by victimisation data (Aebi & Linde, 2010; Blumstein, 2000; Tonry, 2014), homicide also appears to be negatively related to violence measured by police recorded data (Harris et al., 2002; Van Wilsem, 2004). This has two important implications for the current study. Firstly, the relationship between the trends in homicide and violence can differ depending on how violence is measured (Blumstein, 2000; Lauritzen et al., 2015). Secondly, victimisation data should be used to measure violence since victimisation measures are considered more accurate compared to police recorded crime. As has been argued, homicide can only be

⁴ Including assaults, excluding threats and sexual assault (Aebi & Linde, 2010).

⁵ Including assault and robbery (Van Wilsem, 2004).

⁶ These figures represent rates of violent incidents that were reported to the police according to the victim, not police recorded crime (Van Wilsem, 2004).

measured by police recorded crime and since victimisation data is regarded to be a more accurate measurement of violence (McAra & McVie, 2012; Lauritzen et al., 2015; Tonry, 2014; Van Dijk et al., 2007), these two measures are considered to constitute the most reliable measures of homicide and violence in the current study.

Another limitation to the sparse research regarding the relationship between the trends in homicide and violence is that most studies have examined this relationship cross-nationally. Although international comparisons are important, it is of equal relevance to examine this relationship within a single country. A nation-level analysis would furthermore mitigate any validity issues regarding crime data across different countries, such as mentioned by Aebi and Linde (2010). Scotland is suitable for such an analysis for three main reasons: firstly, the relationship between homicide and violence has never been examined in Scotland; secondly, Scotland has been described as one of the most violent countries in the developed world (BBC News, 2005; The Guardian, 2005); and finally, Scotland has very rich sources of data which has seen previous limited use (McVie, Coxon, Hawkins, Palmer & Rice, 2008). The following section will therefore examine the existing literature on changes in trends in homicide and violence in the specific context of Scotland.

2.2.3 The Scottish context: previous research

More than ten years ago, Scotland gained the unenviable reputation of being ‘the most violent country in the developed world’ (BBC News, 2005; The Guardian, 2005). Scotland was described as having the second highest murder rate in Western Europe, three times higher than the homicide rate in England and Wales, and Glasgow was described as the ‘murder capital of Europe’ (The Guardian, 2005). The violence problem in Scotland is deep-rooted, dating back decades (Carnochan, 2015; Damer, 1990; Fraser, 2015). The issue of violence has been particularly centred around knife violence and gang violence, especially in the west part of Scotland (Carnochan, 2015; Damer, 1990; Fraser, 2015), and this type of violence was documented as early as the 1920s and 1930s (Davies, 2007).

Despite this, very few studies have examined the aggregate levels of violence in Scotland. McClintock and Wikström (1990; 1992) published two comparative studies in the early 1990s examining the rate of police recorded violence in Scotland and in Sweden, and concluded that the levels of violence, and homicide in particular, were considerably higher in Scotland. McClintock and Wikström (1990) also stated that the level of violence had increased since the 1960s in both countries, but that the increase was much larger in Scotland. McClintock and Wikström partially attribute this increase to improvements in recording and reporting strategies; however, they also argue that there probably was a real increase in crime.

Smith (2005) compared crime trends between Scotland and England and Wales, and found that despite the cultural similarities between these countries, the trends in crime and punishment were substantially different since 1950. The rise in police recorded crime was substantially lower in Scotland, and crime levelled off after 1980, fifteen years earlier than in England and Wales. Smith found that the level of homicide in Scotland demonstrated a slow increase from 1981 to 1999 in comparison to most other crimes that decreased during this time (Smith, 2005). However, since Scotland and England and Wales differ in criminal law and practices, the differences might stem from differences in recording. Soothill, Francis, Ackerley and Collet, (1999) compared the homicide rate in Scotland with England and Wales in order to examine the effect of recording and coding practices on homicide rates. Data from the Homicide Index from the respective jurisdictions spanning over ten years (1985-1994) was examined, and the findings revealed that there was indeed a real difference in homicide rates, and that Scotland had significantly higher rates of homicide in comparison to England and Wales. The homicide rate was 19.15 per million population in Scotland, compared with 11.28 per million population in England and Wales. Soothill et al. estimated that the differences in statistical recording practices only contributed approximately 0.6 per million population to this difference.

However, this difference was not evident across all categories of homicide. Whereas the male homicide rate in Scotland (28.84 per million population) was over twice as high as the male homicide rate in England and Wales (13.40), the female homicide

rate was approximately similar in the two jurisdictions (10.07 and 9.25 respectively) (Soothill et al., 1999). There was also a significant difference in relation to age. The rates in Scotland were approximately twice as high as the rates in England and Wales for each age group aged 15 years and over. For victims aged 14 years and below, the rates were similar in the two jurisdictions (Soothill et al., 1999). The findings also showed that homicide by 'sharp instrument', 'blunt instrument' and 'hitting or kicking' occurred more often in Scotland compared to England and Wales, although other methods of killing were similar in the two jurisdictions.

Contrastingly, Soothill et al. (1999) found that individuals in England and Wales were at much greater risk for experiencing non-lethal violence overall in comparison to individuals in Scotland, even though Scotland had a higher homicide rate. This was valid for domestic, acquaintance and stranger violence, for male and female victims alike. This would indicate that although the rates of homicide appeared to be higher in Scotland at that point, this was not the case for all categories of violence. It would seem that the pattern of homicide and violence in Scotland was slightly different from that in England and Wales, with a higher rate of male homicide victims killed by an acquaintance by the use of a sharp or blunt instrument, but a similar or lower rate of other forms of non-lethal violence (Soothill et al., 1999).

A few scholars have examined change in crime in Scotland in the light of the recent crime drop. Humphreys, Francis and McVie (2014) examined different types of crime, including non-sexual violent crime, over the crime drop in Scotland and found that violent crime showed two distinct peaks in 1992 and 2003, before demonstrating a consistent and rapid decline. Norris, Pillinger and McVie (2014) furthermore found that although the overall likelihood of being a victim of crime had decreased between 1993 and 2010-11 in Scotland, there was an increase in inequality in victimisation. It would seem that the types of people who experience the most chronic levels of crime and are at greatest risk for victimisation, remain at high risk, and have been largely unaffected by the crime drop (Norris et al., 2014). This group of victims also experienced most assaults and threats, and additionally saw the largest increase in risk of this type of crime over time. Consequently, it would seem that violent crime as a

whole has declined in Scotland, but not equally. This inequality in victimisation underlines the importance of examining the change in violence at a more detailed level. While the overall picture of violence is one of decline, a different pattern emerges when violence is disaggregated by other variables such as amount or type of victimisation.

A few studies have examined sexual homicide in Scotland (Skott, Beauregard, & Darjee, in press; Skott, Beauregard & Darjee, 2018). Although a rare crime, this research suggests important differences between sexual and non-sexual homicide regarding variables relating to the victim, the offender and the incident. However, Skott et al., (2018) also concluded that sexual homicide offenders appear to be more similar to non-lethal sexual offenders than to non-sexual homicide offenders, suggesting a continuum of sexual violence that may or may not be separate from a continuum of non-sexual violence. It is therefore important for any study examining violence, including the current study, to include variables relating to whether or not the violence was sexually motivated in order to examine whether sexually motivated acts of violence differ from non-sexual acts of violence. Although sexual violence can be viewed as a completely different type of crime, as it indeed is reported by the Scottish Government (2016d), sexual violence is valuable to include when comparing violent crimes to homicide. Up to 5% of all homicide cases recorded by the police during the past ten years were sexually motivated⁷ (Scottish Government, 2016c). Sexual offending has also previously been linked to the perpetration of homicide, and sexual homicide has previously been found to be associated with rape (Francis & Soothill, 2010; Grann & Wedin, 2002). It can therefore be argued that only comparing homicide and non-sexual crimes of violence would give a misleading representation of violence in Scotland.

2.2.4 Implications of the lack of knowledge for theory and policy

As the previous sections have shown, little is known about the relationship between homicide and wider violence. There is a lack of consensus regarding whether the

⁷ Additionally, between 13% and 24% of all homicide cases between 2004-2005 and 2015-2016 had an unknown motive (Scottish Government, 2016c)

characteristics of homicide reflect the characteristics of wider violence, as well as whether the trends in homicide follow a similar pattern to trends in wider violence. This overall lack of understanding for the relationship between homicide and violence is problematic for a number of reasons and has important implications for both policy and theory. Homicide and violence have profound implications regarding stress placed on emergency systems, as well as the health of the family and community (Harries, 1989; Harvey, Williams & Donnelly, 2012). These violent crimes also have unparalleled impact on the public perception of crime and fear of crime in society (Perkins & Taylor, 1996; Warr, 2000). Besides the social costs of homicide and violence, these crimes also have great economic costs for the societies in which they occur (Harvey et al., 2012; Waters, Hyder, Rajkoti, Basu, & Butchart, 2005). From a harm reduction perspective, it is therefore important to have a full understanding of the characteristics of homicide and violence as well as how these crimes have changed over time. Lack of such knowledge means a lacking understanding of the exact impact these crimes have on society and the people in it.

Furthermore, whether or not homicide and violence can be interpreted as incidents on the same continuum has important implications for prevention strategies. If the similarities between the characteristics of homicide and violence were such that these crimes could be considered related, the same prevention strategies could be used to tackle both crimes. Similarly, if the trends in homicide and violence follow a similar pattern over time, the changing trends in homicide could be used to monitor the changing trends in violence. As mentioned, homicide is generally considered a more robust measurement with a lower dark figure compared to other crimes, which are not reported to or recorded by the police as often (Brookman, 2005; Granath, 2011; Haen Marshall & Summers, 2012; Tonry, 2014). This means more is generally known about homicide compared to other violent crimes which have a higher dark figure. By using trends in homicide as a barometer for the trends in wider violence, more information about the changing patterns in violence could be obtained. This would have great advantages for the police in increasing the efficiency when directing resources to prevent as well as tackle lethal and non-lethal violence.

If the characteristics or trends of homicide are not related to wider violence, this would however suggest there was something qualitatively different about the act of homicide compared to wider violence. This would imply that separate prevention strategies of homicide might be required as well as suggest that the factors which affected one trend did not seem to affect the other. Violence policy in Scotland, which will be covered at greater length in Chapter 3, is currently included within a broader preventative and collaborative framework to tackle crime (Scottish Government, 2012; 2016a; 2017a; 2017c). Policies aimed at reducing and preventing violence can broadly be divided into two main types: action against violence generally, which is mainly focused on youth violence and knife crime; and action against domestic violence and violence against women, including sexual violence. There is consequently no specific policy aimed at reducing homicide in Scotland; instead homicide is covered within the broader policy strategies addressing violence. Examining the characteristics and trends of homicide and violence and determining the extent to which homicide reflects the characteristics and trends of wider violence is therefore highly important in order to develop and evaluate efficient violence policies.

Understanding the relationship between homicide and violence also has important theoretical implications. Many scholars assume that there is a relationship between these two crime types, considering homicide as an extreme end of a violence spectrum (Brookman & Maguire, 2003; Fajnzylber et al., 2002; Harries, 1989; Harris et al., 2002; Sampson, Raudenbusch & Earls, 1997; Van Wilsem, 2004; Zimring, 1968). As a consequence, homicide is often used as a proxy for other forms of violence in such studies. Although homicide and violence might seem related on an intuitive level (Harries, 1989), which indeed are reflected in various violence policies which includes both crimes (Scottish Government, 2012; 2016a; 2017a; 2017c), it is yet to be determined whether the characteristics and trends of homicide are similar to the characteristics and trends of wider violence. The change in homicide and violence over time might furthermore be related to a number of factors, such as changes in reporting or recording practices, societal change, changes economic inequality or changes in the cultural perception of violence (Blumstein, 2000; Harris et al., 2002; Lauritzen et al., 2015; Tonry, 2014), and is not always representative of an actual change in these

crimes. As mentioned, only a limited number of studies have actually examined the relationship between characteristics or trends in homicide and violence over time, and the results are contradictory, at best.

Despite this, scholars attempting to explain the decline in homicide that has been evident across Western Europe make assumptions regarding this relationship that are not empirically supported. Although various theories and hypotheses regarding the causes of the crime drop has been proposed (Hale, 1998; Eck & Maguire, 2000; Levitt, 2004), not many of them have been able to effectively explain why homicide has declined (Tonry, 2014). Some theories, including general theories of the crime drop such as the Security Hypothesis and the Debut Crime Hypothesis (Farrell et al., 2010; 2014), assume that homicide is declining in tandem with other forms of crime, including wider violence. Other hypotheses, such as the 'Medical Care Hypothesis', assume that homicide is declining while violence is increasing, and attempt to explain why these two crimes differ. Both Blumstein (2000) and Harris et al., (2002) for instance explain the increases in violence and decreases of homicide as symptomatic of improved medical care. This highlights the theoretical implications of examining the relationship between homicide and violence and these theoretical perspectives will therefore be examined in greater detail in the next Chapter.

Regardless of theory, the explanations mentioned above build on different assumptions regarding the relationship between the characteristics and trends in homicide and violence that are yet to be supported. Can homicide be regarded as the extreme end of a violence spectrum or are the characteristics of homicide substantially different from wider violence? Do the trends in homicide reflect the trends in wider violence or do these two crimes change differently over time? The answers to these questions will have direct impact on the theories outlined above since they are built on contrasting assumptions about this relationship. This constitutes a gap in the crime trends research, as well as in the theories attempting to explain them. The examination of the relationship between homicide and violence therefore holds important implications to inform future theory as well as providing a deeper understanding of how different violent crimes are interconnected within a society.

2.2.5 Summary of previous research

Although previous research has examined aggregate levels of violence and homicide in Scotland to a certain extent, there are still many questions left unanswered. A deeper analysis of the changing nature of homicide and violence in Scotland is lacking. This nation-level analysis of the relationship between homicide and violence would provide valuable policy implications for organisations such as Police Scotland and the Scottish Government. Information regarding how homicide relates to other forms of violence would be beneficial in terms of directing policy or resources to where they are needed most. A few studies have examined violent crime over the recent crime drop, which has helped to inform the greater picture of violence in Scotland. Although these more recent studies have underlined the importance of examining the change in crime at a more detailed level, none of the studies have examined homicide or violence in specific detail, such as the relationship between homicide and wider violence over time. There are consequently two aspects that need to be examined in Scotland if the relationship between homicide and violence is to be understood; the similarities and differences between the characteristics of homicide and violence, and the similarities and differences in the trends between these two crimes over time.

The previous sections have outlined previous research about the relationship between homicide and wider violence, both internationally and in Scotland, and identified the gaps in this research. Before the current study can begin to fill those gaps, statistics of homicide and violence trends in Scotland needs to be examined in order to get a more detailed picture of what these trends look like. The following section will therefore examine aggregate statistics of homicide and violence published by the Scottish Government.

2.3 Trends of homicide and wider violence in Scotland

2.3.1 Measures of violence in Scotland

The Scottish Government produces an annual statistical bulletin on national statistics of all crimes and offences recorded and cleared up by the police (Scottish Government, 2016d). There are however difficulties with comparing these crime rates over time.

Police recorded crime does not reflect the true incidence of crime but is a measure of the crime reported to and recorded by the police. In fact, it has been approximated that only about 38% of all crime is reported to the police (Scottish Government, 2016e), a number that is likely to be even lower for crimes of a sexual nature (Daly and Bouhour, 2010; RCS, 2016). Sexual crimes are especially difficult to measure over time, not only because there have been many legislative changes concerning the definitions of the criminal acts⁸ (Scottish Government, 2016d), but also because there have been shifts in the public perception regarding this type of crime, which effects the number of crimes reported to the police. Older crimes of a sexual nature which have more recently come to light may also have affected these figures (The Sunday Express, 2017). Police recorded crime is furthermore sensitive to practices in police recording or public reporting, as well as legislative changes (Scottish Government, 2016d). For instance, in 2004-2005 the Scottish Crime Recording Standard (SCRS) was introduced in an attempt to improve the consistency of crime recording (Scottish Government, 2013b). The implementation of the SCRS however removed the requirement of corroborative evidence before a crime was recorded, which resulted in an artificial increase in crime figures (HMICS, 2008; Fraser et al., 2010). It has therefore been argued that police recorded crime should be viewed as a measure of police activity rather than crime (Haen Marshall & Summers, 2012). Despite this, police recorded crime provides a valuable reference point for the rates and general level of crime within a country (Fraser et al., 2010).

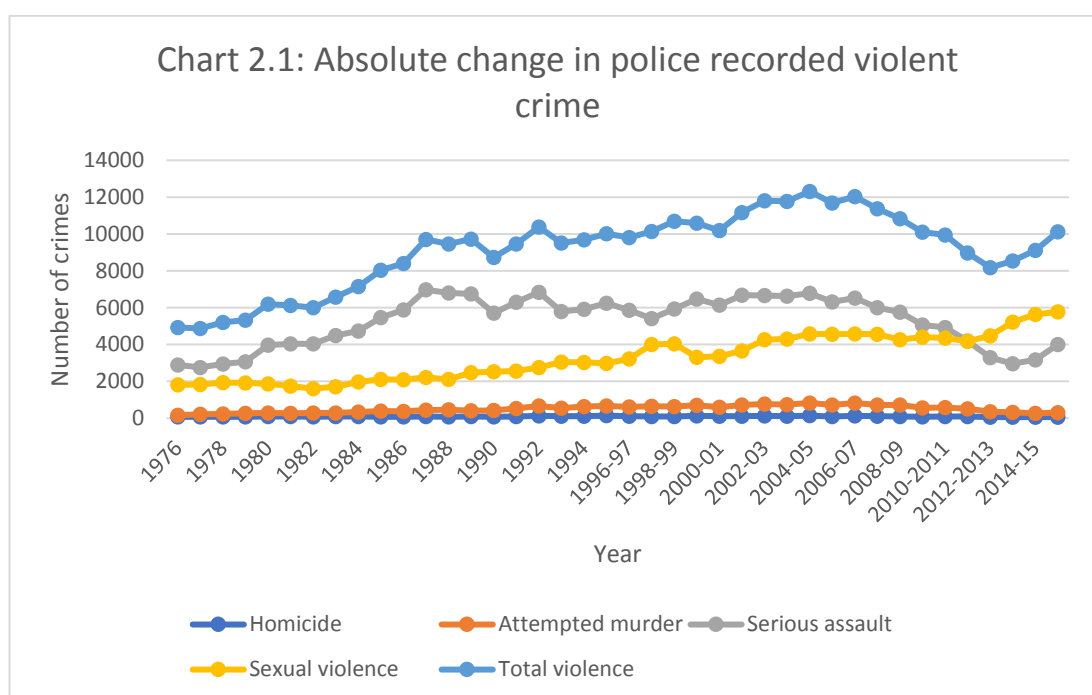
As mentioned, others have argued that victimisation data is a more reliable measure for estimating the levels of crime within a country than police recorded crime (McAra & McVie, 2012; Tonry, 2014; Van Dijk et al., 2007). The Scottish Crime and Justice Survey (SCJS) is a self-reported study aiming to measure crime and victimisation in Scotland, and provides an estimate of minor and serious violence (Scottish Government, 2016e). However, since the SCJS is a self-reported victimisation study, it does not include homicide. Due to the sensitive nature of the crime, there are also difficulties in measuring sexual victimisation with the SCJS. The figures reported in

⁸ The implementation of the Sexual Offences Act 2009 in 2010 led to several changes in the sexual crimes, for instance a wider definition of rape (Scottish Government, 2016d).

the survey are weighted and grossed to estimate the total number of crime and proportions among the adult population in Scotland living in a private household (Scottish Government, 2016e). For the purposes of this study, it is held that both the police recorded crime statistics and the statistics from the SCJS provide useful and complementary information to assess changes in trends and patterns in violent crime over time.

2.3.2 Long-term trends in violence and homicide

In order to examine the long-term trends in violence, four subgroups of police recorded violence were examined since 1976⁹: homicide¹⁰; attempted murder; serious assault and sexual violence¹¹.

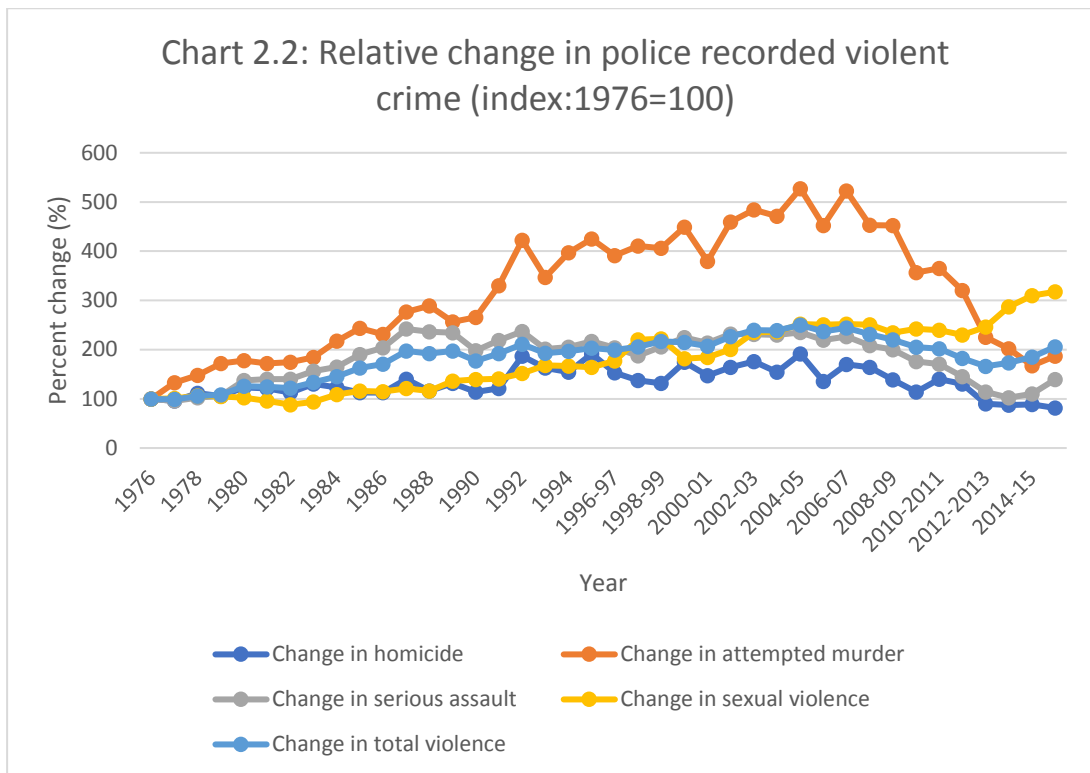


Note 1: Source: Scottish Government, (2014e; 2016d)

⁹ 1976 is used as the first year since this is the first complete comparable year of recorded crime statistics (Scottish Government, 2014a). Data from 1975 is incomplete due to local government reorganisation, and can not be broken down into categories.

¹⁰ Homicide only includes murder and culpable homicide.

¹¹ Sexual violence includes: Rape and attempted rape; and Sexual assault.



Note 1: Source: Scottish Government, (2014e; 2016d)

As can be seen from charts 2.1 and 2.2, all types of police recorded violent crime, measured as ‘total violence’, increased steadily from the mid-1970s, peaking in 2004-05 with an increase of about 150% compared to 1976, before decreasing until 2012-13. A second increase was subsequently evident in the last three years, from 2013-14 to 2015-16. This meant that ‘total violence’ had increased by 106% in 2015-16 compared to 1976 (see chart 2.2). When examining the relative change in trends of the different crime types it can be seen that the trend in serious assault appeared to follow the trend in total violence quite closely. This is however not surprising since serious assault constituted the most common crime type examined and was therefore likely to drive this trend (see chart 2.1). Overall, violence had increased by 39% in 2015-16 compared to 1976 (see chart 2.2).

The trend in homicide however appeared to have two peaks; one in 1995-96 (91% increase compared to 1976) and 2004-05 (91% increase compared to 1976). After this second peak in 2004-05, homicide decreased until 2015-16 without demonstrating another increase, unlike the other crime types. This means that in 2015-16, homicide

was at an all-time low with 57 recorded homicides, which was a decrease of 19% compared to 1976 (see chart 2.2). As can be seen from chart 2.1, homicide remained the least common type of police recorded violence examined. Although the magnitude of the increase was different from homicide, attempted murder also increased from 1976, peaking in 2004-05 (with 427% increase compared to 1976), and then decreased until 2014-15. Despite this vast increase in attempted murder, this crime constituted a very small proportion of the trend in total violence (see chart 2.1). Overall, attempted murder had increased by 87% in 2015-16 compared to 1976.

The trend in sexual violence was, however, quite different. Although sexual violent crime demonstrated a slow increase along with the other violent crimes, it continued to increase until 2015-16. The increase in sexual violence was furthermore very steep in the last four years measured and as can be seen from chart 2.1, sexual violence surpassed serious assault as the most common type of police recorded violence in 2012-13. In 2015-16, sexual violence had increased by 217% since 1976, demonstrating the largest increase of all violent crime. Overall, homicide was the only crime that had decreased in 2015-16 compared to 1976, and this decrease also proved to be significantly lower than the change in attempted murder¹², serious assault¹³ and sexual violence¹⁴.

The remarkable peak and increase in attempted murder (see chart 2.2) could be due to several factors. Firstly, the absolute number is rather small (see chart 2.1), which means that small changes may create large relative figures. Secondly, there might be a reduction in violence seriousness, meaning that fewer violent acts end in the death of the victim in the later years examined compared to the earlier years. Thirdly, the differences in trends might be explained by improved medical care and emergency services. Since the difference between a murder and an attempted murder might be

¹² According to a Mann Whitney U test between the trends of homicide (Md=131.7, n=40) and attempted murder (Md=325.2, n=40; $U=1506.5$, $z=6.80$ $p<0.05$, two-tailed).

¹³ According to a Mann Whitney U test between the trends of homicide (Md=131.7, n=40) and serious assault (Md=200.6, n=40; $U=1269.5$, $z=4.51$ $p<0.05$, two-tailed).

¹⁴ According to a Mann Whitney U test between the trends of homicide (Md=131.7, n=40) and sexual violence (Md=172.3, n=40; $U=1096.5$, $z=2.85$ $p<0.05$, two-tailed).

related to the speed and availability of medical assistance (Smit, de Jong & Bijleveld, 2012), the improvements in such emergency services that has been evident in Western Europe would reduce the number of actual murders while increasing the number of attempted murders and serious assaults. As can be seen from chart 2.2, homicide has decreased in Scotland while attempted murder and serious assault in fact increased since 1976. This might be explained by either of the factors mentioned above, or a combination of them all. This would mean that the decrease in homicide, in addition to reflecting an actual decrease, also might reflect a shift in violence seriousness and improved medical care. This medical care hypothesis has previously been discussed by other authors in relation to both Canada and USA (Farrell & Brantingham, 2013; Harris et al., 2002) and to Western Europe overall (Aebi & Linde, 2010; 2012; Tonry, 2014). Tonry (2014) found that out of all violent incidents, the proportion that ended lethally had decreased almost by half from 1990 to 2001.

Others have however argued that improvements in medical care alone could not have caused the major declines in homicide evident in Europe and elsewhere (Harris et al., 2002; Blumstein, 2000; Tonry, 2014). Additionally, there was a strong¹⁵ positive correlation between the long-term change in homicide and the increase in attempted murder ($\rho=0.85$, $n=40$, $p<0.05$), which would indicate that homicide and attempted murder have followed similar trends since 1976, despite the huge differences in numbers. The relative trend in homicide also demonstrated a strong positive relationship with the relative trends of serious assault ($\rho=0.76$, $n=38$, $p<0.05$). There was no significant relationship between the trends in homicide and sexual violence however. This would indicate that the medical hypothesis has limited explanatory value of the homicide decline in Scotland, since the trends between the different violent crimes (excluding sexual violence) are correlated. If improved medical care explained the decline in homicide, the numbers of attempted murders and serious assaults would be expected to have increased while homicide would have decreased markedly during the same time. However, as can be seen from Chart 2.2, homicide

¹⁵ Following Cohen's d criteria of weak ($r=0.10-0.29$), moderate ($r=0.30-0.49$) and strong ($r=0.50-1.0$) correlations (Cohen, 1988).

demonstrated a slow increase until the mid-1990s, after which homicide, attempted murder and serious assault all decreased.

2.3.3 Comparing recorded crime to victimisation data

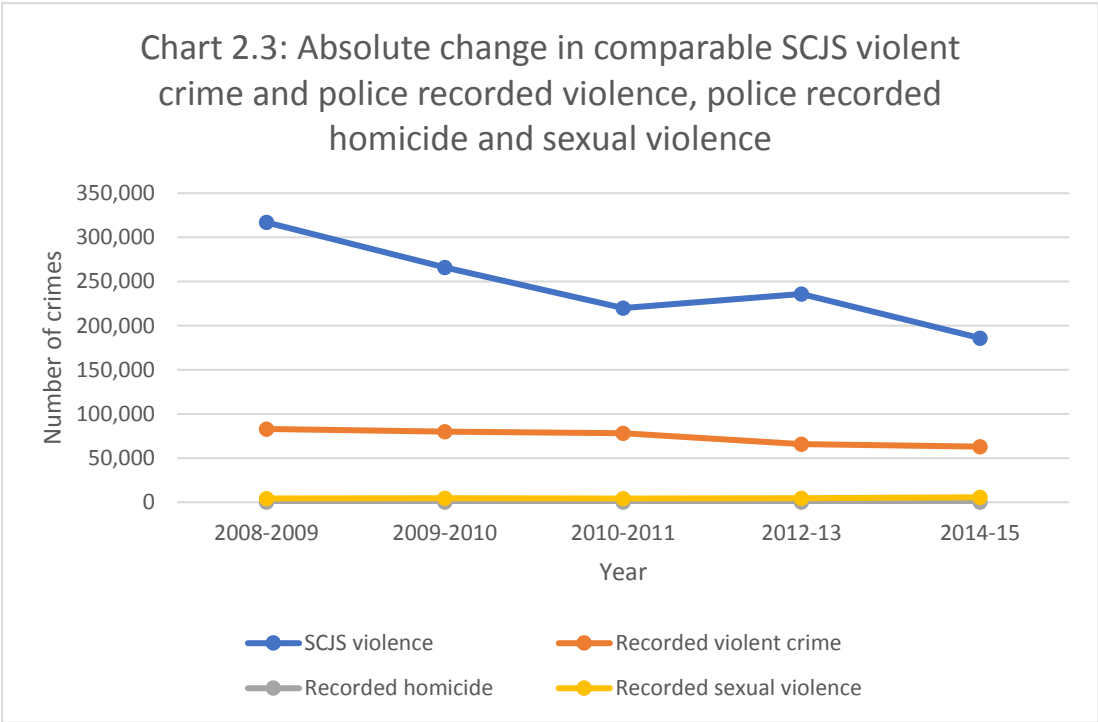
Since police recorded crime cannot be considered to reflect the true incidence of crime, it is useful to compare the figures with victimisation data from the SCJS, which can be considered a more comprehensive measure of crime. As previous research has shown, the measurement of violence can have great implications for the relationship between the trends in homicide and violence over time (see section 2.2). The estimated violent crime figures from the SCJS have consistently been higher than police recorded crime rates (Scottish Government, 2016e) which would indicate an actual higher victimisation rate than comes to the attention of the police. Due to differences in data, approximately 60% of all SCJS crime is comparable to police recorded crime (Scottish Government, 2016e). In order to be able to compare recorded crime numbers with the numbers from the survey, the yearly bulletin provides comparable figures from the 2008-09 survey and onwards (see Charts 2.3 and Chart 2.4). None of the previous surveys were included since the methodology is considered to be too different before the 2008-09 survey to be comparable¹⁶.

As can be seen from Chart 2.3, considerably more violent crimes were reported to the SCJS than were recorded by the police. As Chart 2.4 shows, violence as reported by the SCJS has decreased by approximately 41% in 2014-15 compared to 2008-09, a decrease that was significantly greater than the increase in police recorded sexual violence¹⁷, but statistically similar to the decrease in police recorded serious assault, and homicide. Comparable police recorded violence had decreased by 24% in 2014-15 compared to 2008-09 and homicide had decreased by 36%. Sexual violence, as previously mentioned, had however increased by 32% over this time period. In fact, when the relationship between these trends was examined, it was found that both measures of violence (SCJS data and recorded crime) demonstrated similarities in the

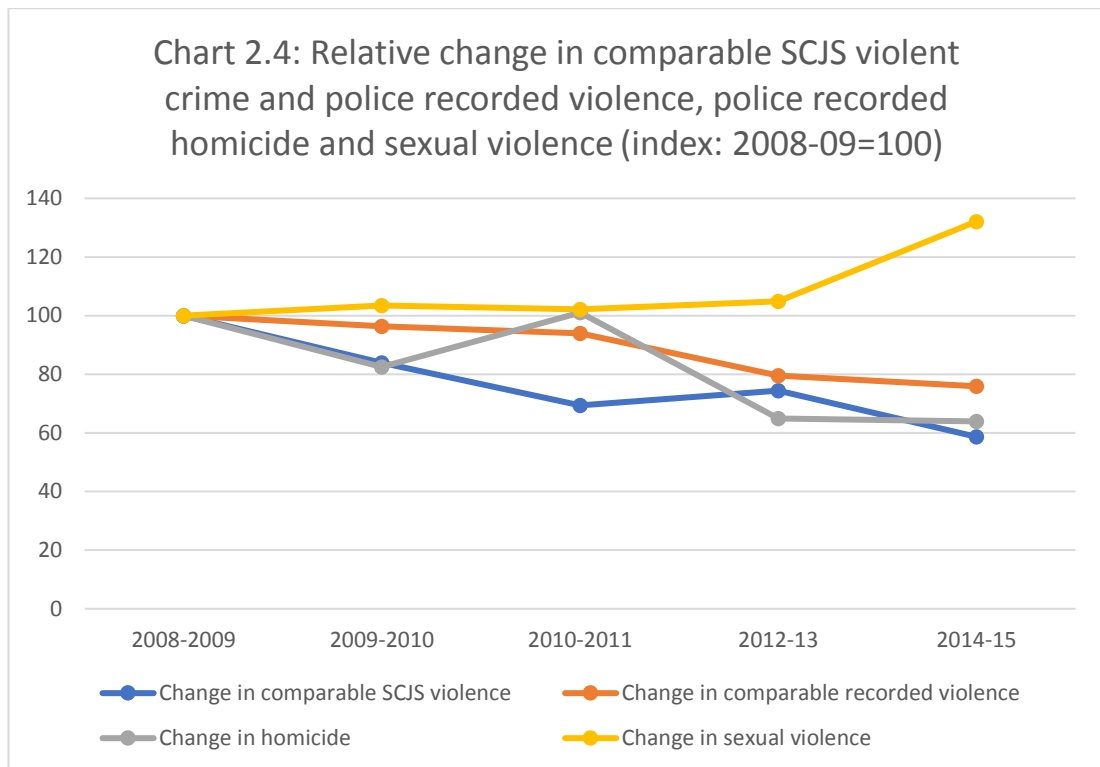
¹⁶ For more information about the SCJS, see Chapter 4, section 4.4.

¹⁷ Mann-Whitney U tests of SCJS serious assault (Md=74.4, n=5) and Police recorded sexual assault (Md=103.5, n=5; $U=0,5$, $p<0.05$).

relative change over time. The decrease in SCJS violence was strongly related to the decrease in police recorded violence ($\rho=0.90$, $n=5$, $p<0.05$), which indicates that the trends in these two measures of violence indeed follow a similar pattern.



Note 1: *Source*: Scottish Government, (2016e).
 Note 2: Neither homicide (murder and culpable homicide), nor sexual violence is included in either of the other two comparable violent crime groups, and these numbers are therefore strictly not comparable. These figures should therefore be compared with caution.
 Note 3: years were chosen depending on the SCJS sweeps.



Note 1: Source: Scottish Government, (2016e).

Note 2: Neither homicide (murder and culpable homicide), nor sexual violence is included in either of the other two comparable violent crime groups, and these numbers are therefore strictly not comparable. These figures should therefore be compared with caution.

Note 3: years were chosen depending on the SCJS sweeps.

Chart 2.4 furthermore shows that police recorded homicide also demonstrated a similar decreasing trend to SCJS serious assault. There was a moderate, positive relationship between SCJS serious assault and police recorded homicide ($\rho=0.40$), however, this relationship was not statistically significant. This is concurrent with the findings of Van Wilsem (2004), who also found that police recorded homicide was related to the levels of self-reported victimisation. However, in contrast to Van Wilsem (2004), the levels of police recorded homicide also appear to be related to the levels of police recorded violent crime in Scotland, perhaps even more so than self-reported victimisation. It would in other words seem that the homicide trend in Scotland is more closely related to police recorded violence than to self-reported measures of violence. This is different from what previous studies have found when comparing the relationship between trends in police recorded violence and violent victimisation data (Blumstein, 2000), and constitutes another reason for conducting this study in Scotland.

Consequently, these charts and figures demonstrate several findings regarding the relationship between homicide and wider violence in Scotland. Firstly, although there have been increases in some violent crimes that is not reflected in homicide, such as in police recorded attempted murder, there was a significant relationship between the change in homicide and attempted murder and homicide and serious assault over time. This significant relationship would indicate that homicide does follow a similar decreasing trend to other non-sexual police recorded violent crimes since 1976. Secondly, police recorded homicide appears to follow a similar trend to self-reported violence from the SCJS, although this relationship appears to be weaker. This would indicate that homicide indeed may be representative of other non-sexual violent crimes within a country, much like Van Wilsem (2004) argued. However, previous studies have found a relationship between homicide and sexual violence (Francis & Soothill, 2010; Grann & Wedin, 2002), which was not supported in the current study. Although homicide appears to be following the same trend as non-sexual violent crime in Scotland, this does not appear to be the case for sexual violence, despite the fact that some homicide cases are sexually motivated. Although this might be due to a real difference between the trends in homicide and sexual violence, it is also possible that a potential relationship between homicide and sexual violence is obscured by the use of unidimensional measurements of these crimes. The next section will therefore briefly examine the critique regarding the use of unidimensional measurements of violence.

2.4 The need for disaggregation

Trends in homicide and non-sexual violence in Scotland consequently appear to follow a similar pattern, but as previously argued, more information is needed about this relationship. Previous studies that have examined the trends in homicide and violence over time have not reached an accord regarding the relationship between trends in homicide and violence. Perhaps this disparity is not only due to cultural differences in policy or recording of crime, but also to the use of inadequate measurements of both homicide and violence. More recent developments in homicide research have underlined the limitations of measuring homicide as a unidimensional construct (Blumstein, 2000; Lehti, 2014; Messner & Savolainen, 2001; Roberts & Willits, 2015;

Thompson, 2015). Studies have previously demonstrated that both different types of homicide and different types of violence vary across covariates and other variables, and have pointed to the necessity of disaggregating both these violent crimes in order to understand these relationships (Blumstein, 2000; Block & Block, 1995; Kubrin, 2003; Kubrin & Wadsworth, 2003; Lehti, 2014; Mares, 2010; Messner & Savolainen, 2001; Tapscott, Hancock & Hoaken, 2012; Thompson, 2015). As previously shown, different patterns than the overall trend can be revealed when violence is broken down by other variables and examined in specific detail (Chilton & Chambliss, 2015; Norris et al., 2014).

Scholars have furthermore identified that certain types of homicide and violence can share more similarities across this crime boundary than within (Block & Block, 1995; Maltz, 1994). Block and Block (1995) for instance argued that domestic homicides were more similar to non-lethal domestic violence than to other types of homicides such as robbery homicides. Indeed, Block and Block labelled non-lethal violent crimes that were similar to homicides as 'sibling crimes'. Identifying subtypes of both homicide and violence for comparison might therefore reveal similarities between the characteristics of these two crimes that would otherwise be obscured. Not only would this provide more detailed information regarding both homicide and violence, but this would also greatly enhance the knowledge regarding how these two crimes are related over time. Perhaps only some types of homicide or violence have decreased, or perhaps some types have remained stable. For instance, when Lehti (2014) disaggregated homicide in Finland, he found counter-trends hidden within the greater homicide drop. While the drop in homicides seemed to be driven by a decrease in alcohol-related homicides committed by working-age men, homicides committed by young females had increased (Lehti, 2014). Previous research has also shown that similar underlying patterns might emerge when homicide is disaggregated into subtypes although differences exist between two countries on the bivariate level (Messner & Savolainen, 2001; Skott, Beuaregard, Darjee & Martineau, 2018). Likewise, Blumstein (2000) argued that the change in the aggregate homicide rate in the U.S was a product of several, distinct trends that needs to be separated and addressed in order to explain the decline.

The necessity of considering homicide a multidimensional phenomenon has therefore become more widely accepted among homicide researchers all over the world (Lehti, 2014). Similarly, there is an argument in crime trends research stating that changes in aggregate rates may reflect different, and potentially opposite trends for different heterogeneous sub-groups in the population (Hox, 2002; Lindley & Novick, 1981). Combining these sub-groups and treating them as if they were the same can lead to erroneous conclusions, known as ‘Simpson’s Paradox’ (Hox, 2002:3; Lindley & Novick, 1981). In other words, decreases in violent crimes at the aggregate level does not mean that all *subtypes* of these crimes are falling equally. In fact, while some subtypes of lethal and non-lethal violence are decreasing in line with the general trend, other types may remain stable, or might even increase over time. In order to examine this however, subtypes of homicide and violence must be identified. The identification of such subtypes would not only prevent Simpson’s paradox, but also operationalise homicide and violence as multidimensional constructs (Blumstein, 2000; Lehti, 2014; Roberts & Willits, 2015; Thompson, 2015). The following Chapter will therefore examine previous research on typologies relating to both homicide and violence.

2.5 Chapter conclusions

This Chapter has examined previous research about the relationship between homicide and violence, both internationally as well as in Scotland. Although the knowledge about this relationship was identified as a gap in research almost 30 years ago, very little research has been conducted about this since then and the few studies which have examined this have all found contrasting results. The lack of consensus and understanding in this area is furthermore problematic since scholars have been known to make unsubstantiated claims about the relationship between homicide and violence in order to support various theoretical perspectives. It is therefore vital that this relationship is examined further, not just cross-nationally but on a national level. Although Scotland was described as one of the most violent countries in the developed world (BBC News, 2005; Daily Record, 2015; The Guardian, 2005), very little research has been conducted regarding the aggregate levels of violence in Scotland. When the statistics of homicide and violence was examined in Scotland, the findings

indicated that although the trends in sexual violence appear to be following a different pattern, the trends in homicide and violence seem to decrease similarly over time, regardless of how violence is measured. However, as recent research has argued, aggregate trends in homicide and violence might not tell the whole story. There might be certain types of homicide and violence which demonstrate different trends over time, despite the overall decline in these two crimes, leading to erroneous results when aggregated. These types might also help inform the relationship between the characteristics and trends of homicide and violence.

This Chapter has therefore argued two things. Firstly, that there are two aspects that need to be examined if the relationship between homicide and violence is to be understood; the similarities or differences between the characteristics of homicide and violence, and the similarities or differences in the trends between these two crimes. Secondly, this Chapter has argued for the need to disaggregate homicide and wider violence by examining subtypes of these crimes in order to fully understand the relationship between homicide and wider violence. The following Chapter will therefore examine various theoretical perspectives on the crime drop and crime trends, as well as examining previous typology research of violence and homicide.

Chapter 3: Theories, Policies and Typologies

3.1 Introduction

As the previous Chapter has examined the research regarding the relationship between the characteristics of homicide and violence as well as examining the relationship between the trends in these two crimes, this Chapter aims to examine three additional elements relevant to the relationship between homicide and violence: theoretical explanations of the relationship between homicide and violence; previous and current violence policies in Scotland; and previous research on violence and homicide typologies. Two main families of theories will be explored to provide a framework for understanding the problem at hand: crime opportunity theories; and cultural explanations of violence, including the construction of masculinity. These theoretical perspectives were chosen because they provide an explanation for the changes in the trends of homicide and violence while at the same time providing a deeper understanding for the mechanisms behind these two crimes and how these crimes are constructed within society. Additionally, these perspectives have been linked to the relationship between homicide and violence in previous research and policy literature. Previous and current policies aimed at reducing violence will subsequently be outlined in order to examine how the problem of violence has been constructed over time in Scotland.

The Chapter will also review previous typology research in order to examine types of homicide and violence previously identified, as well as to examine what variables were deemed most relevant when identifying these types. It will be argued that homicide typologies are preferable over violence typologies since they tend to be more explorative in nature compared to violence typologies. The most important variables relating to the offender, the victim and to the incident of homicide will then be examined in order to help inform the decision of classifying variables of both homicide and violence in the current study.

The Chapter will begin with an examination of theoretical perspectives relating to the relationship between homicide and violence.

3.2 Theoretical explanations of the relationship between homicide and violence

Examining lethal violence from a theoretical perspective is important in order to understand this crime, not only in itself but also as a social problem, and any impact this problem has on wider society (Innes, Tucker, & Innes, 2017). There are various theoretical perspectives which attempt to explain homicide or violence on one hand, and various other theoretical perspectives which aim to explain changes in crime trends on the other. However, few theories attempt to explain both. While many theories explaining the mechanisms and characteristic of homicide tend to be from microsocial perspectives, providing intricate explanations for why and how homicides might be committed, such as for instance Collins' (2008) theory on situational processes which leads to violence and homicide, these theories do not offer an explanation as to why trends in homicide would change over time. Similarly, while explanations such as a drop in the high-risk demographic of young men provides a framework for understanding the decline in crime (see Zimring, 2007), such theories do not provide a deeper understanding of the characteristics in homicide or violence.

Two main families of structural theories will be examined: crime opportunity theories and cultural theories. These theories were chosen for two main reasons. Firstly, these theories provide an explanation of the relationship between crime trends as well as the characteristics and mechanisms of homicide and violence. Crime opportunity theories explain the change in homicide and violence by changes in crime opportunity, linking the perpetration of violence to structural situations and how we live our everyday lives. Cultural explanations of violence, including the link between violence and masculinities, connect the perpetration of violence to the construction of violence in society. According to these cultural perspectives, change in the trends in these crimes are related to the changing construction of these crimes within a culture.

Secondly, both of these theories have been extensively linked to the relationship between homicide and violence in previous research and policy literature. Previous research which have studied the relationship between the trends in homicide and

violence have all linked their findings to crime opportunity theories (Aebi & Linde, 2010; Blumstein, 2000; Harris et al., 2002; Van Wilsem, 2004). These theories are also quite common in homicide research (see for instance Pizarro, 2008). Similarly, policies and prevention strategies of violence in Scotland (which will be discussed later in this Chapter), frame the problem of violence within a cultural framework, particularly relating the issue of violence to the construction of masculinities (Scottish Government, 2014a; 2016b). Although research using cultural theories when explaining the relationship between homicide and violence is less common, these perspectives are employed extensively in policies, particularly in Scotland. These theories are therefore relevant for the current study in order to understand how the perpetration of violence is linked to how violence is framed and prevented within a society, which in turn is related to how violence and homicide is changing. These two branches of theory together provide a structural framework for explaining the changes in the trends of homicide and violence while at the same time providing a deeper understanding for the characteristics of these two crimes and how these crimes are constructed within society. The next section will therefore examine different crime opportunity theories, beginning with theories attempting to explain the crime drop.

3.2.1 Crime opportunity theories

Various theories and hypotheses regarding the causes of the crime drop have been proposed, such as changed crime justice policies and legislation, increased securitisation and economical and societal change (Aebi & Linde, 2010; Farrell, 2013; Tonry, 2014). The empirical support for these theories has, however, been quite varied. There is, furthermore, the issue of explaining changes in international crime trends using national variables such as increases in incarceration or legislative changes (Farrell et al., 2010). Building on crime opportunity theories, Farrell et al., (2010) proposed an explanation of the crime drop called the Security Hypothesis. Farrell et al., (2010; 2014) argued that crime rates have declined as a result of decreased available targets for crime. These targets have furthermore become less available due to increased and improved measures of securitisation. This could explain the falling trends in crime, especially regarding property crimes such as car theft and burglary. But as Farrell et al., (2010; 2014) argued, this securitisation process would also affect

the trends in violent crime. Since these property crimes constitute what Farrell et al., (2011; 2014) call 'debut crimes', the prevention of these crimes would avert more people from engaging in criminal careers, which would most likely involve violent crimes. In other words, violent crimes, including homicide, would according to the Security Hypothesis and the Debut Crime Hypothesis be falling as a result of increased securitisation and decreased availability to offend (Farrell et al., 2011; 2014). Due to the focus on public crime, these hypotheses do not explain change in domestic violence, however.

Another theoretical explanation for the decrease in violent crime is the Medical Care Hypothesis (Blumstein, 2000; Harris et al., 2002; Smit et al., 2012). According to this hypothesis, homicide and violence are demonstrating different trends over time due to improvements in medical care and emergency services. Since fewer people die as a result of their injuries, homicide trends are decreasing while trends in violence are increasing. These two general crime drop theories do in other words provide contrasting explanations for the relationship between the trends in homicide and violence, which further highlights the need for this research. As argued in the previous Chapter, these theories make assumptions about the relationship between these two crimes yet to be supported empirically. In order to understand the relationship between homicide and violence, and to be able to theorise about this relationship, it is therefore important to examine whether or not homicide and violence do follow a similar pattern over time. Both theories, although contrasting, are therefore relevant for the current study.

3.2.1.1 Routine activities and the privatisation of violence

Both of the general crime drop theories mentioned above are based on the ideas of Situational Crime Prevention (Clarke, 1983; Clark, 1995) and Routine Activities Theory (Cohen & Felson, 1979). These perspectives postulate that crime occurs whenever three different elements converge: a motivated offender, a suitable target and the absence of a capable guardian. Neither perspective claims to explain why individuals commit crime; instead, propensity to crime is understood as given, and the theory attempts to explain the social structures that allow individuals to translate

criminal inclinations into action (Cohen & Felson, 1979; Felson & Cohen, 1980). The approach of Situational Crime Prevention includes measures directed at specific types of crime, by manipulating, managing or designing the immediate environment as permanently and systematically as possible in order to reduce the opportunities for crime and increase its risks as perceived by the offenders (Clarke, 1983). Situational Crime Prevention has however been criticised for not preventing crime, but merely displacing it (Guerette & Bowers, 2009). By implementing prevention strategies in one area, such as increased surveillance or control of public spaces, without tackling the underlying propensity to commit crime, the same behaviour simply continues to exist in another shape or form (Clark, 1983). The evidence for the extent of crime displacement is however mixed, with some studies arguing that such implementations are still beneficial (Guerette & Bowers, 2009).

For the current study, this means that any changes identified in the trends in homicide and wider violence might be related to a change in routine activities. Theorists of Routine Activities Theory such as Cohen and Felson (1979) argue that differences in crime trends, including that of homicide, are related to the structural change of routine activities within a society. Routine activities are defined as any activity that is part of everyday life, such as work, social interaction or leisure (Cohen & Felson, 1979; Meier & Meithe, 1993). According to this perspective, the evident decrease in homicide over time might therefore be related to the change of routine activities within Western countries. For instance, Aebi and Linde (2010) argued that the decrease in homicide and violence might be related to decreased interactions in public places. It is becoming increasingly common, especially among young people, to spend time indoors by computers and other forms of entertainment instead of spending time in public places such as the streets, leading to fewer opportunities to engage in violence (Aebi and Linde, 2010). However, whether or not crime occurs in a domestic rather than public setting has also been linked to socioeconomic status and marginalisation, particularly when it comes to youth crime (Aebi & Linde, 2010). Aebi and Linde argued that things such as access to a steady internet connection in the home is conditioned by the socioeconomic status of the offender's family. Young people who spend less time in public places, they argue, are therefore individuals with a medium or high

socioeconomic status. Although the relationship between a fall in violent crime and improved internet connection has been contested (Farrell et al., 2014), the connection between marginalisation and violent crime has been widely proven (see for instance Brookman, 2005; Land, McColl & Cohen, 1990; Polk, 1994).

It has also been argued that a privatisation of violence has taken place, meaning that violence has become more private and less public in nature (Cooney, 2003). Cooney argued that violence in modern societies is considerably more individualised, as in occurring more often between just two or a few individuals, as well as more intimate; a higher degree of violent acts occur between people who know each other well in modern societies compared to earlier societies. Cooney also argued that this relative increase in the intimacy of violence is related to a steady decrease in violence between strangers, particularly unrelated men, compared to violence between intimates. These two processes, individualisation and increased intimacy, together have led to an overall privatisation of violence, where violence more commonly occurs in private contexts rather than public. As Cooney argued, this privatisation of violence is directly related to the modernisation of society, which not only has increased individualisation and intimacy of violence, but also reinforced the link between marginalisation and violence. Overall, crime opportunities theories, such as routine activities theory and the privatisation of violence, offer important insights for understanding the change in homicide and violence over time as well as the relationship between these two crimes over time.

The following section will examine the second family of theories and its relevance to the current study; cultural explanations of violence, which link the perpetration of violence to the construction of violence.

3.2.2 Cultural explanations of violence

One of the first scholars to link the change in homicide trends to cultural or social development was Durkheim (DiCristina, 2004; Durkheim, 1951 [1897]; Durkheim, 1957 [1900]). Durkheim argued that as the collective bonds of society disintegrate, rates of lethal violence decrease since the 'moral individualism' created through this

cultural change also brought an increased respect and value for the individual's life. This also led to tougher legal prohibitions preventing homicide, which in turn led to a further decline in lethal violence. Durkheim argued that the waning significance of collective bonds in society were symptomatic of a more socially advanced, 'higher' society, linking societal and cultural change to changes in homicide trends. In contrast, 'lower societies' with strong collective sentiments and intense commitment to religion, family or other collective institutions had higher rates of homicide since these societies put lesser value to individual life and considered offences against these collective institutions as 'sacrileges', and could therefore act as 'stimulants to murder' (DiCristina, 2004; Durkheim, 1951 [1897]; Durkheim, 1957 [1900]). Durkheim also argued that periods involving great social or economic change could lead to what Durkheim refers to as 'anomie'; a sense of inability to satisfy one's desires caused by changes in the opportunity structure, which in turn could lead to a state of exasperation and weariness which could lead to either suicide or homicide.

Since Durkheim, many scholars have continued to examine the relationship between cultural and societal change and the change in homicide and violence. Such research does not only concern itself with the changes in trends of homicide or violence but with the way homicide and violence is constructed in society and the impacts this construction have. For instance, Young (2004; 2007) argued that there currently is a Paradigm of Violence in society, which includes neutralisation techniques for violence rather than condemning it, and provides narratives for when and where violence is justified. As Hatty (2000) argued, narratives about violence, as well as the discourses underpinning these narratives, are central to how violence is patterned in society. Violence, according to the Paradigm of Violence, is in other words both overt and glorified in our late modern society (Young, 2004; 2007).

Late modernity has been described as characterised by risk, globalisation and technical advancements. It also emphasises individualism, creativity and generation of lifestyle (Young & Hayward, 2012). According to Young (2007), the situation of late modernity is both paradoxical and contradictory, with both liberative and repressive potentials of all the major institutions. Young furthermore argues that late modernity

has caused a feeling of disembeddedness on both a social and individual level, where norms become dissolved and normative borders blur and detach. This gives rise to a feeling of ontological insecurity and precariousness, something that Young (2007) refers to as the Vertigo of Late Modernity;

I have talked of how insecurities in economic position and status, coupled with feelings of deprivation in both these spheres, engender widespread feelings of resentment both in those looking up the class structure and those peering down. Such insecurities can be experienced as a sense of vertigo, and, outside of the charmed sphere of contented minority, such uncertainties are tinged with anger and dislike. [...] Vertigo is the malaise of late modernity: a sense of insecurity of insubstantiality, and of uncertainty, a whiff of chaos and a fear of falling (Young, 2007:12).

When the building-blocks of identity become insubstantial and contested, the personal narrative and the constructing of identity becomes difficult (Young, 2007). As a result, the previous routes used to form one's identity are no longer perceived as substantial, and the individuals of late modernity are forced to seek fulfilment in different places than before. As Young argues, this ontological insecurity – 'an identity in crisis' (Young, 2007:35) – gives way for a process of othering as a mechanism to enforce one's own identity. This othering in turn both promotes and facilitates violence (Young, 2007). In other words, the disembeddedness and ontological insecurities created by the culture of late modernity itself can be viewed as conducive to violence, particularly for marginalised individuals dealing with issues of relative deprivation.

Similar to the Paradigm of Violence, Giroux (Evans & Giroux, 2015; Giroux, 2013) argues that we are living in a Culture of Violence; a culture in which violence, both real and symbolic, has become ubiquitous. In this culture, human suffering and imagery of violence has been turned into spectacles of violence, where the commodification and framing of violent acts renders some lives meaningful, while dismissing others as disposable, eroding social bonds (Evans & Giroux, 2015). This Culture of Violence has also increased our sense of fear, as well as measures of control, which is much in line with previous studies of late modernity (Giroux, 2013; Giddens, 1992; Garland, 2001). Giroux (2013) argues that this fear is particularly pertinent in

public places, and especially targeted towards youth. This has led to dramatic measures to increase securitisation and surveillance of such places, without any attention on collective security or social welfare (Beck, 1992; Evans & Giroux, 2015; Giroux, 2013). Measures to decrease violence and other crime in public places have been implemented in most countries in the Western world over the past decades, including Scotland (Scottish Government, 2017i).

Both the Paradigm of Violence (Young, 2007) and the Culture of Violence (Evans & Giroux, 2015; Giroux, 2013) relate the construction of violence to issues of identity as well as current power structures in society. Additionally, the Culture of Violence connects violence to masculinity, and reaffirms violent acts as an expression of masculinity (Giroux, 2001; 2013). The next section will therefore examine the link between masculinities and violence.

3.2.2.1 Violence and masculinities

‘The social construction and performance of masculinities are central to understanding violence’ (Ray, 2011:195).

Many scholars have identified the connection between violence and the expression of masculinity (Connell & Messerschmidt, 2005; Hatty, 2000; Messerschmidt, 1999; Kreiger & Dumka, 2006; Polk, 1994; Polk, 1999; Ray, 2011; West & Zimmermann, 1987). This connection appears to be particularly prominent in Scotland, where cultural representations of violent masculinities have been evident for decades (Fraser, 2013; 2015). Not only has the concept of violence been integral to the construction of masculinities in Scotland in the past, evident for instance through the notion of ‘the hardman’ or ‘the fighting man’ (Fraser, 2015:68), but violence and the construction of masculinity is still very much linked in Scotland (Fraser, 2013; 2015). This link is particularly evident in gang-related violence (Fraser, 2013; 2015).

Overall, it has been widely established in the literature that gender is something we ‘do’ rather than ‘is’, and that gender is constantly recreated within different social contexts, affected by social and structural constraints (Connell & Messerschmidt, 2005; West & Zimmerman, 1987). In the same way as postmodern interpretations of

subjectivity considers the Self as fluid and changeable, masculinity can be viewed as changeable, heterogenous and fluid: a process (Hatty, 2000). Masculinity is performative, and it is generally considered that there is not just one type of masculinity, but multiple versions, structured by class, social position and age (Hatty, 2000; Ray, 2011).

Violence, then, can be seen as a way of expressing or ‘doing’ masculinity, to solve interpersonal disputes but also to reaffirm the cultural definition of manliness (Hatty, 2000; Messerschmidt, 1999; Polk, 1994). In fact, violence has even been described as ‘integral to masculinity’ (Hatty, 2000:120). However, Hatty (2000) argues that masculinity tends to be split into a dichotomous construction of ‘the respectable’ and ‘the dangerous’ in contemporary society. The respectable form of masculinity are fathers, families or people in the home, whereas the threat or the dangerous forms of masculinity are the strangers, the sexual predators, the unknown. Hatty argues that this is a form of a new ‘pathology of the monstrous’ (Foucault, 1978:5) that creates a misleading dichotomy of violent men. This form of Othering of violent masculinity, often divided into intrafamilial versus extrafamilial masculinity, serves to distract the culture from the violent actions of ordinary men by relegating: ‘the monstrous to the zone beyond the family, outside the domestic’ (Hatty, 2000:66). This Othering also perpetuates the notion that only a small minority of the population resemble these violent ‘monsters’.

Although this Othering of violent masculinity is highly problematic, the erosion of this dichotomy is equally problematic (Hatty, 2000; Ray, 2011). As Hatty argues, the form of masculinity and how masculinities take its expression is related to current male anxieties and worries in society, as ways of overcoming anxieties about issues such as unemployment, sexuality or identity. The erosion of these boundaries therefore leads to a crisis around the construction of masculinity; a crisis in regards to what is masculine and feminine, and a crisis in relation to the boundaries of these constructs. Violence can then function as a demarcation, or reaffirmation of such boundaries (Hatty, 2000; Ray, 2011). But violence is also intrinsically linked to marginalisation, and a sense of powerlessness (Ray, 2011). Any change in the levels of violence evident

in Scotland might therefore be an indicator of changing patterns or expressions of masculinities, which is why it is important to examine the link between the two.

Making the link between violence, gender and class, Polk (1994; 1999) argued that violence is not only masculine but also marginalised. Violence as an expression of masculinity appears especially prevalent among marginalised men who find themselves cut off from the conventional routes of resolving issues (Messerschmidt, 1999; Polk, 1994). As Polk (1994) argued, middle- or upper-class men seldom become involved in situations which lead to homicide, nor do they find themselves in situations only solvable through violence. Physical prowess and aggression might no longer be as necessary for the economically advantaged male to reaffirm and express his masculinity. However, for the marginalised male who possess fewer of these resources, violence, including ultimately lethal violence, might be called into play in order to face challenges of status and to reaffirm their masculinity (Polk, 1994; 1999). This might be one of the reasons why some men do and some men do not use violence as a tool of affirming their masculinity. As Polk argued, scenarios of male homicide are not only masculine, but also distinctly working- or underclass in nature.

Violence against women, most commonly a sexual partner, as an expression of masculinity, has been widely discussed and researched in previous literature (Dobash & Dobash, 2011; Connell & Messerschmidt, 2005; Hatty, 2000; Polk, 1994; Polk, 1999; Ray, 2011). When this violence becomes lethal, the victim is often killed as a reaction of them leaving the offender; as a reaction to the loss of control over the victim. When women kill within the context of a sexual relationship it is however most commonly committed in defence of previous male violence (Polk, 1994). It has been empirically proven that the victim is more likely to be a family member, such as an intimate partner, compared to when men kill, and there is often signs of abuse in such cases (Polk, 1994). In other words, homicides motivated by possession, jealousy and control are emphatically masculine in nature.

Although it has been found that violence and homicide are overwhelmingly masculine activities (Hatty, 2000; Ray, 2011) it is often overlooked that men most often are the

victims of this violence as well (Polk, 1999). Polk (1994; 1999) argues that such male-on-male homicides often are related to some sort of honour contest, as a response to a perceived threat to their status or masculinity (Polk, 1994; Polk, 1999). Such honour contests are usually defined as ‘bar brawls’, involving some sort of provocation from one of the parties, which often can seem trivial to an outsider (an insult or a shove for instance). This provocation, or challenge to the other person’s honour or status, is then accepted by the other person, which usually triggers the fight (Polk, 1999). This means that the line between victim and offender becomes muddled (Polk, 1999). Some studies, such as by Wolfgang (1958), also label this type of homicide as ‘victim participated homicides’.

These honour contests usually take place in informal places, including bars or pubs, restaurants or even out on the street (Polk, 1999). The social setting conducive for honour contests also includes two main features: a social audience of young male peers (which makes the honour contest public); and the presence of alcohol (Polk, 1999). A social audience has previously been identified as a contributing factor to homicide. Building on Goffman’s (1967) ideas of ‘character contests’, Luckenbill (1977:177) argued that acts resulting in murder involve joint contributions of the offender and victim where attempts to ‘establish or save face at the other’s expense’ are made, most commonly in front of a social audience. Other research has also demonstrated that the presence of third parties can increase the risk of homicide (Ganpat et al., 2013). Honour contests can also be described as a ‘young male syndrome’ (Polk, 1999:11; David & Wilson, 1988) in that most men who engage in this sort of behaviour are between 18 and 40 years old.

The relationship between violence, masculinity and marginalisation as shown here is relevant for the current study for several reasons. Firstly, since both homicide and violence are overwhelmingly male activities (Connell & Messerschmidt, 2005; Hatty, 2000; Polk, 1994; 1999), understanding the connection between the construction of masculinity and the perpetration of violence is therefore vital if the changes in these crimes are to be understood. Secondly, certain aspects of these mechanisms underpinning the construction of masculinity have been shown to increase the lethality

of violence. Polk (1994) for instance argued that violence taking place in the presence of a social audience has a greater risk of ending lethally due to the way masculinity is constructed within this particular context. Thirdly, the link between masculinities and violence seems to have been prominent within the Scottish culture (Fraser, 2015), which highlights the need to examine this link in this research. The social context in which violence and masculinity are expressed is therefore important for understanding how patterns of homicide and violence have changed over time and for explaining any difference between lethal and non-lethal violence.

While neither of these cultural perspectives mentioned above makes any claims about the change in homicide or violence over time, what these theories show is that the way we construct and think about violence within a culture has direct implications for how this problem is tackled, what policies are framed around violence as well as what interventions are put in place to reduce this crime. These policies and interventions in turn are important when examining and understanding the changes in homicide and violence over time. For instance, the fear of violence which the Culture of Violence arguably includes, particularly centred around public places, has according to Giroux (Evans & Giroux, 2015; Giroux, 2013) led to increased surveillance and securitisation measures of such places all over the Western World, including Scotland (Scottish Government, 2017i). It is therefore important to understand how the problem of violence is framed and constructed within a society in order to be able understand the interventions and policies put in place. The next section will therefore examine previous and current policies and interventions put in place in Scotland to reduce violence and homicide in order to examine how this problem has been framed over time.

3.3 Policies and interventions of violence in Scotland

Historically, one of Scotland's greatest problem areas in regards to violence has been knife violence, particularly among young men, with documented gang-related violence going back to the 1920s (Davies, 2007). In fact, Leyland (2006) found that the homicide rate had risen 83% between 1981 and 2003 in Scotland, and that this rise was largely attributable to an increase in homicides using knives and other sharp

objects. Leyland also found that this increase was particularly marked among young men. This massive increase in violence and knife carrying among young people observed by Leyland (2006) resulted in several initiatives by the Strathclyde Police Force in the early 1990s. The Strathclyde Police Force was at the time the largest force in Scotland, and this area included approximately two thirds of all Scottish criminals (Orr, 1998). Glasgow was a particularly problematic area in regards to violence with issues relating to multiple deprivation, such as unemployment and drug use (Fraser, 2015; Orr, 1998). For instance, Operation Spur was launched in order to recover criminally held firearms; Operation Turnkey targeted housebreaking offences and Operation Eagle was aimed at reducing the supply, dealing and use of drugs (Orr, 1998). Among these was an initiative called Operation Blade, launched in 1993 in the Strathclyde Police force by Chief Constable Leslie Sharpe in an attempt to address the increasing tendency of young people to carry and use knives (Bleetman, Perry, Crawford & Swann, 1997). Operation Blade included multiple interventions, such as a knife amnesty, an intensified stop and search campaign, improved CCTV and street lighting, but also conversations with knife retailers and pupils in secondary schools. Despite early positive results of this campaign, Bleetman et al., did not find any significant difference in the number of victims before the implementation and after, however. They concluded that although the impact of Operation Blade was not sustained, initiatives such as this might need to be repeated with regular intervals in order to change the social attitudes in the longer term.

Although these initiatives demonstrated positive results, including improved public support of the police, violent crime was still increasing (Orr, 1998; Scottish Government, 2014d). Additionally, the public fear of violence, including gang related violence, was particularly high at this time. Another police initiative was subsequently launched in Strathclyde in 1996 by the new Chief Constable John Orr called Operation Spotlight (Murray & Harkin, 2016; Orr, 1998). The aim of this initiative was to dramatically reduce violent crime as well as reduce disorder and fear of crime in the force area. Based on the ideas of Broken Window theory (Kelling & Wilson, 1982), Operation Spotlight included a strong focus on tackling minor crimes as a way of preventing serious crime, and had a firm commitment to maximise officer presence on

the streets (Orr, 1998). Described as a ‘crack-down on crime’ with a ‘gloves off’ approach (Orr, 1998:106), it was perceived by many as a ‘zero tolerance’ policy for violence, even though it was explicitly stated that it was not (Orr, 1998:106; Murray & Harkin, 2016). With Operation Spotlight, a new style of policing was however introduced, with less focus on attempting to understand and explain the problem at hand, and more focus on action and visibility of the police. This led to a massive increase in stop and search practices, often on a non-statutory basis (Murray & Harkin, 2016). Different from the more multi-faceted interventions initiated by Operation Blade, this was a ‘Spotlight-style’ of policing, illuminating certain problem areas at different times and aiming to ensure that ‘the criminal would always be on guard!’ (Orr, 1998:118).

Despite these interventions, violent crime in Scotland continued to increase (Scottish Government, 2014d). By 2005, both violence and homicide rates were at an all-time high in Scotland (Scottish Government, 2014d). In light of this, the then Chief Constable of Strathclyde Police Willie Rae established the Violence Reduction Unit as a new initiative to address the violence problem (VRU, 2016). Different from the crack-down, ‘gloves off’ approach of Operation Spotlight (Orr, 1998), the Violence Reduction Unit framed violence as a public health problem, advocating early prevention strategies and multi-agency collaboration to reduce violence, teaming up with agencies in the field of health, education and social work (VRU, 2016; 2017). By framing violence as a public health problem, the interventions to reduce violence became linked to other problematic areas of deprivation, such as unemployment or homelessness, examining the causes of crime and encouraging a ‘bigger picture’ response to violence (VRU, 2016; 2017).

In 2006, the Violence Reduction Unit became a national unit, with a predominant focus on preventing knife crime (VRU, 2016). The public concern about knife carrying, especially among youths, still remained very prevalent in Scotland. Despite the fact that youth violence was then at the centre of public debate in Scotland with an emerging moral panic around youth crime and antisocial behaviour, leading to a crackdown on this type of behaviour advocated by the then Justice Minister Cathy

Jamieson (McAra, 2010), not very much was known about the nature or prevalence of violence committed, as there was a lack of available data (Fraser, Burman, Batchelor & McVie, 2010). The long-term trends between 1996 and 2007 in criminal conviction for violent crimes among young people indicated an increase in violence and handling offensive weapons, but an overall decrease in convictions for robbery which mirrored trends in property crime rather than violence (Fraser et al., 2010). There was no significant change regarding the convictions for homicide, however. Other research suggested that most young people who carried knives tended to do so very infrequently and not as a persistent pattern of behaviour (Bannister et al., 2010; McVie, 2010). This evidence suggested it was a 'core' of young people who were engaged in repeated weapon use, and that this core was responsible for a huge part of all incidents. In other words, the issue was not increased weapon use across the board, but rather a small but persistent group of young violent offenders, often suffering from multiple aspects of deprivation and vulnerability.

In order to tackle this problem, multiple intervention strategies were launched by the Violence Reduction Unit, including the Community Initiative to Reduce Violence (CIRV), Medics Against Violence in 2008, and the Ask, Document, Validate, Refer (ADVR) intervention for domestic violence aimed at dentists in 2009 (VRU, 2016). The establishment of the VRU marked a new direction for violence policy in Scotland. In 2007 the Cabinet Secretary for Health declared violence a public health problem, the No Knives Better Lives initiative (NKBL, 2016) was established in 2009, aimed at raising awareness about the consequences of knife carrying, and the same year the Scottish Government announced the Building Safer Communities Program, a flagship initiative aimed at reducing the number of victims in Scotland (BSC, 2016; Scottish Government, 2017c; VRU, 2016). This holistic approach, aimed at accelerating the crime reduction in Scotland, is a collaborative programme with both national and local partners aimed at reducing the number of victims of crime and the reducing unintentional injury that could have been predicted or prevented in Scotland.

Although public violence involving knives, mostly committed by young men, continued to be a strong policy focus in Scotland, new policies aimed at domestic

violence were also developed during this time. An approach to tackle violence against women, *Safer Lives, Changed Lives* was published by the Scottish Government in 2009 which formed the basis for their violence against women strategies focusing on prevention and early intervention (Scottish Government, 2009c; Scottish Government, 2017a). The prevention and reduction of domestic violence was also one of the main priorities of the new Chief Constable of Strathclyde Police, Stephen House, appointed in 2007 (Murray, 2016). The processes of policy development and implementation have however been criticised in Scotland for reinforcing gendered and social hierarchies (Hearn & McKie, 2010). By failing to actively gender the representation of the problem as well as reinforcing a demarcation between the public and the private, the response to this gendered violence has been accused of being individualised and a-gendered, framing the problem as one of ‘atypical men’ (Hearn & McKie, 2010:149).

Building on the *Safer Lives, Changed Lives* approach, a full strategy for preventing and eradicating violence against women and girls called *Equally Safe* was launched in 2014 (Scottish Government, 2014a; 2016b). The *Equally Safe* strategy, updated in 2016, was developed by the Scottish Government in collaboration with COSLA¹⁸ and other public and third sector organisations (Scottish Government, 2016b). The strategy focuses on all forms of violence against women, including domestic, sexual and honour-based violence, linking violence against women and girls to deep-rooted issues of inequality and prioritises preventative strategies as well as multi-agency and multi-sector responses to combat this type of violence. The *Equally Safe* strategy includes interventions such as the establishment and development of the Violence against Women and Girls Joint Strategic board in order to identify emerging issues and to provide leadership, the roll-out of Multi-Agency Tasking and Co-ordinating Groups (MATAC) by Police Scotland, which target serious and serial domestic offenders, as well as the development of a performance framework in order to be able to measure and evaluate the outcomes of MATAC (Scottish Government, 2016b). Interventions also include the development of public health guidance to support the implementation of the *Equally Safe* strategy within the NHS and to commission research into forced

¹⁸ COSLA stands for Convention Of Scottish Local Authorities and is a national association of Scottish councils (COSLA, 2017).

marriages in Scotland. Another programme launched to reduce domestic violence include The Caledonian System, in operation since 2011, which works with men convicted of domestic abuse with a programme aimed at reducing reoffending, in combination with integrated services for women and children (Ormston, Mullholland & Setterfield, 2016; Scottish Government, 2017h).

A range of new legal acts relating to domestic and sexual violence have also been put in place over the last few years, including the Sexual Offences Act (Scottish Parliament, 2009), which for the first time introduced a legal definition of rape, and the Criminal Justice and Licencing Act (Scottish Parliament, 2010) which introduced stalking as a statutory offence as well as removing the requirement for a public element to the offence. The Abusive Behaviour and Sexual Harm Act was also introduced in 2017 (Scottish Parliament, 2016), modernising the law on domestic and sexual abuse, which for instance increased the power of the courts to make non-harassment orders and introduced an offence for sharing private intimate images without consent (commonly referred to as ‘revenge porn’) (Scottish Government, 2017g). A Domestic Abuse Bill (Scottish Parliament, 2017a), which introduces domestic abuse (including non-physical abuse) as a statutory offence is currently also being introduced to the Scottish Parliament. Funding to train Independent Domestic Abuse Advisers (IDAAs) to provide support for high-risk domestic abuse survivors has also been provided by the Scottish Government to help guide them through the legal system (Scottish Government, 2017g).

Following the unification of Scotland’s eight police forces into one in 2013, Police Scotland has maintained a strong focus on preventing and reducing domestic abuse with the formation of the National Domestic Abuse Task Force and specialist domestic abuse investigation units in every local policing division in Scotland (Scottish Government, 2015a). In their new strategic programme for the forthcoming ten years, ‘Policing 2026’, Police Scotland emphasises prevention as well as risk and harm reduction, linking the tackling of crime with inequality and enduring problems in communities (Police Scotland, 2017b).

3.3.1 Policy Summary

The current policies to tackle violence in Scotland have consequently shifted into framing violence as a public health problem, connected to wider issues of deprivation, inequality and social context. There is a strong focus on building an evidence base around these issues and to examine and gain a deeper understanding of the problem at hand. There is little trace in current policies of the crack-down, ‘gloves-off’ approach advocated during the mid-1990s. Instead, violence in Scotland is tackled within a ‘bigger picture’ perspective, which is trying to get at the causes of violence as well as reducing it. As mentioned, the current policy response to reduce and prevent violence can broadly be divided into two main foci: action against violence more generally, which has a specific focus on youth violence and knife crime; and action against domestic violence and violence against women, including sexual violence.

3.3.2 Understanding homicide and violence

The previous sections of this Chapter have examined theoretical perspectives on homicide and violence as well as how these two crimes have been constructed through shifting policy strategies in Scotland over time. Although all of the theoretical perspectives examined offer an explanation for the relationship between homicide and violence in some shape or form, either in the way these crimes are constructed or how the trends are related, none of these theories take the heterogenous nature of these crimes into account. As argued in the previous Chapter, both homicide and violence have been identified as multidimensional constructs which need to be disaggregated in order to be understood (Blumstein, 2000; Lehti, 2014; Messner & Savolainen, 2001; Roberts & Willits, 2015; Thompson, 2015). The next section will therefore move on to examine previous typology research. This will be done in order to examine what variables previous studies have found to be important when disaggregating homicide and violence, starting with the literature of homicide typologies.

3.4 Typology research

As mentioned in Chapter 1, types are defined as the identified profiles of characteristics of homicide and violence. A typology is for the purposes of the current study defined as the collection of types within a specific crime. Different types of

homicide would therefore make up a homicide typology. This section will examine previous typology research, for two main reasons. Firstly, in order to examine what types of violence and homicide that have been identified in previous research to enable comparisons of the types identified in the current study. Secondly, in order to examine what variables have been identified as important in previous research when disaggregating these two forms of violence since this will help guide the decision on what variables to use when identifying subtypes in this research. This review will begin by examining previous research on homicide typologies.

3.4.1 Homicide typologies

There are many different typologies of homicide that overall appear to be more diverse than similar (Polk, 1994:20). Wolfgang (1958) was among the first scholars to examine different types of homicides and his work remains influential to this day (see for instance Brookman, 2005; Ganpat et al., 2013; Polk, 1994). Wolfgang (1958) was not only among the first scholars to argue that victims and offenders should be examined together as social actors of the same event, but also among the first researchers to note that homicide most commonly occur among people who know one another. Even though Wolfgang's study included variables relating to the victim, offender and the incident of homicide, many of the earliest developed homicide typologies were based almost exclusively on classification variables concerning the incident. This section will therefore begin with examining typologies based on incident variables only. Typologies based only on offender variables and victim variables respectively will then be examined before the section will end by examining typologies based on all three of these aspects.

3.4.1.1 Typologies based on incident variables

One of the first and most influential homicide typologies was created by the FBI based on the level of organisation the offender demonstrated at the crime scene (Hazelwood & Douglas, 1980; Roberts, Zgoba & Shahidullah, 2007). Hazelwood and Douglas (1980) proposed a typology of lust murderers based on various crime scene-related variables such as: the location of the body of the victim; attempts to conceal the body; evidence of torture prior to death; and type of weapon used. Depending on the presence

of these variables, two personality types of the lust murderer were proposed: the Organised Non-social offender, described as methodical and cunning; and the Disorganised Asocial offender, described as less methodical and frenzied. Although the typology developed by Hazelwood and Douglas contains several relevant variables, it is mostly based on professional experience rather than research or empirical findings. Other offence-based typologies, such as the victim/suspect mobility typology developed by Tita and Griffiths (2005), have demonstrated the importance of offence-related variables, such as joint mobility patterns, when disaggregating homicide. Although such variables are arguably most useful when combined with other types of variables such as the motive (Tita & Griffiths, 2005) or premeditation of the offender (Corsaro, Pizarro & Shafer, 2017), locus is an important variable when examining types of homicide.

3.4.1.2 Typologies based on offender variables

Rather than developing a typology based on offence variables, some studies have disaggregated homicide based on offender-related variables. One example is the Crime Classification Manual which classifies homicide into a four-fold typology (Criminal Enterprise; Personal Cause; Sexual Homicide; and Group Cause) based primarily on the motivation of the offender (Douglas, Burgess, Burgess & Ressler, 1992/2006). It has however been noted that the utility of the four-fold typology created by Douglas et al (1992/2006) is limited and hardly used in practice (Keppel & Birnes, 2003). Other homicide typologies based on variables relating to the offender have disaggregated homicide based on psychological variables (Biro, Vuckovic & Djuric, 1992; Brad, Coupland & Olver, 2014; Kudryavtsev & Ratinova, 1999), premeditation of the offender (Beauregard & Proulx, 2002; Biro et al., 1992), injuries the offender afflicted on the victim (Beauregard & Proulx, 2002; Salfati, 2000) and previous criminal records or level of violence of the offender (Brad et al., 2014; Pizarro, Zgboa & Jennings, 2011; Roberts et al., 2007). Thomas, Dichter and Matejkowski (2011) identified two different forms of homicide offenders based on characteristics of the offender and situational variables. They labelled these types the Intimate Partner murder and the Non-Intimate Partner murder. Thomas et al. found that the Intimate Partner murderers appeared to have a more stable lifestyle compared to the Non-

Intimate Partner murderers, with a higher probability of being employed and having a stable relationship. Smit, Bijleveld and van der Zee, (2001) developed a general typology of Dutch homicide based on the motive of the offender and the relationship between offender and victim. This typology was however criticised for not being empirically optimal in a later study (Bijleveld & Smit, 2006, see below).

Salfati (2000) found that homicide cases could be divided into two main types based on variables measuring the behaviour demonstrated at the crime scene: Expressive acts and Instrumental acts. Expressive acts of homicide suggested that the behaviours at the crime scene were directed to hurt the victim specifically, whereas the victim in the instrumental acts functioned as a tool for the offender to attain an ulterior aim such as money or sex (Salfati, 2000). Of the 247 homicide cases in the analysis, 55% demonstrated the same theme in their crime scene actions and background characteristics, supporting the link between the background characteristics of the offender and the behaviour the offender demonstrates on the crime scene. The dichotomy of instrumental or expressive violence utilised by Salfati (2000) has however been criticised for being too simplistic since most violent offenders usually commit both instrumental and expressive acts (Cornell et al., 1996; Fox & Allen, 2014).

Some studies have specialised in particular forms of homicide offenders, such as female serial killers (Farrell, Keppel and Titterington, 2013; Hickey, 2012; Kelleher & Kelleher, 1998), mass killings (Fox & Levin, 2005) and offenders of sexual homicide (Beauregard & Proulx, 2002). Typologies of rare, multiple homicide cases have however been criticised for favouring the 'high class' of murders; the cases that creates headlines and vast media attention, and thereby ignoring the far more frequent 'underclass' of homicide cases (Roberts et al., 2007). Although cases of multiple homicide could have very detrimental effects for the public fear of crime and for confidence in the criminal justice system (Fox & Levin, 2005; Keppel & Birnes, 2003), there is a substantially higher number of one-off homicide offenders that cause a more significant strain or stress on the criminal justice system (Roberts et al., 2007). Roberts et al. (2007) therefore developed a typology of homicide of individuals who were

previously not convicted of any crime. The aim was to examine the relationship between the proposed typology and recidivism. The typology was based on the circumstances of the homicide case, the motive of the offender and the relationship to the victim and included four types: Homicide that was precipitated by a general altercation or argument; Homicide during the commission of a felony; Domestic violence-related homicide; and Homicide after an accident. None of the 336 offenders examined committed another murder (Roberts et al., 2007). The highest recidivism rate regarding non-lethal violence was within the felony group, followed by the altercation precipitated homicide group. Just as with the crime scene variables, the motive of the offender has therefore been proven to be an important variable when categorising homicide (Douglas et al., 1992, 2006; Cornell et al., 1996; Fox & Levin, 2005).

Polk (1994) examined homicides occurring between 1985-1989 in Victoria, Australia, and found nine different types of homicide scenarios based on the circumstances of the event, the nature of the conflict and the relationship between the offender and victim. Polk (1994) labelled these types as: Homicides in the context of sexual intimacy; Homicides originating in family intimacy; Confrontational homicides; Homicides originating in other crime; Conflict resolution homicides; Victims of mass killers; Unsolved (and unclassifiable) homicides; 'Special' cases (such as when mental illness is involved); and Mercy killings. Homicides in the context of sexual intimacy was the most common type, and were motivated either by jealousy or possessiveness, as an act of the destruction of the woman, or motivated by the depression of the man, where the primary aim was self-destruction. In these latter cases, the women were considered possessions which the man should take with him on his 'final journey' (Polk, 1994). Additionally, this type of homicide also included cases where the victim was a sexual rival of the male.

The second most common type Polk (1994) identified was Confrontational homicides. These were distinctly masculine in nature and motivated by the sense to defend one's honour. These confrontational homicides tended to evolve from fights, leading to fatal injuries, and usually involved verbal insults. The vast majority of these homicides were

committed by men against men. The third largest type were homicides that occurred in the context of another crime (Polk, 1994). This was another type of homicide which was predominantly male in character, and bears similarities to other homicides types previously identified as 'instrumental homicides' in the literature (see for instance Salfati, 2000). A large proportion of this type involved strangers. Another type of homicides identified by Polk (1994) was homicide as a form of conflict resolution, constituting one in ten of all homicides in the study. Most of the offenders and victims knew each other in this type, and they often lived marginalised lives, characterised by unemployment, drug use and criminal activity.

3.4.1.3 Typologies based on victim variables

Very few homicide typologies have disaggregated homicide on the basis of victim-related characteristics alone. Pizarro, Zgoba and Jennings (2011) identified a two-type typology of homicide victims based on their criminal lifestyle. This typology consisted of one type of homicide victim that was highly involved with violent crime, drug crimes and gangs, and one type of homicide victim that had lower involvement in previous criminality overall (Pizarro et al., 2011). A few typologies have also incorporated variables relating to the victims when creating homicide subtypes. For instance, Biro et al., (2014) included variables relating to the behaviour of the victim at the time of the murder. As the studies mentioned above have shown, many homicide typologies only disaggregate homicide on the basis of the motive or the relationship between the offender and the victim (Cooney & Phillips, 2002). A homicide case however arguably consists of three aspects; the offender, the victim and the incident itself, and has been described in these terms in the past (see for instance Liem, et al., 2013). It has furthermore been argued that examining the aspects of homicide separately does not offer a clear overall picture of the context in which the crime takes place (Beauregard & Proulx, 2007; Meier, Kennedy & Sacco, 2001). Instead, any comprehensive analysis of crime must take all three of these aspects into account (Meier et al., 2001). The next section will therefore examine homicide typologies based on variables relating to the victim, the offender and the incident of homicide simultaneously.

3.4.1.4 Typologies based on offender, incident and victim variables

Six typologies were found which either identified or compared their types on variables relating to the offence, the offender and the victim. Five of these typologies were examined in greater detail (see table 3.1). The sixth typology developed by Liem and Reichelmann (2014) initially based their analysis on more than 50 variables relating to the victim, the offender and the incident itself, but after conducting a two-step cluster analysis, Liem and Reichelmann however found that only three cluster variables were necessary in order to identify the types: Age of the offender; Relationship between the offender and the victim; and Attempted offender suicide. These variables were chosen for both conceptual and empirical reasons; many of the other variables such as gender and ethnicity proved to be ‘swamping variables’ or statistically rare (Liem & Reichelmann, 2014). Four subtypes of familicides were identified; Despondent Husbands (the killing of spouse and children followed by suicide); Spousal Revenge (the killing of spouse and children not followed by suicide); Extended Parricide (the killing of parents and siblings); and Diffuse Conflict (the killing of multiple family members with diverse conflicts and relations). These distinct types of familicide cases led to the argument that familicide in fact is different from other forms of mass killings and multiple murders (Liem & Reichelmann, 2014). Since this typology was not based on any victim variables, or conducted statistical comparisons of victim variables between types, it will not be examined in greater detail.

Morton, Runyan, Moracco and Butts (1998) proposed a typology of homicide-suicides of a female victim older than 15 years old between 1988 and 1992 in North Carolina. Although quite specialised, this typology was based on over 100 variables relating the victim, the offender and the incident of homicide (see summary in table 3.1). Although Morton et al. states that their classification was not meant as a new typology, they still identified three different types of Partner homicide-suicides: Type I (characterised by a history of conflict between the offender and victim, sometimes with additional non-familial victims); Type II (which included children as additional victims, sometimes even the entire family); and Type III (which included elderly victims of declining health, very similar to ‘mercy killings’ in previous literature) (Morton et al., 1998).

Wood Harper and Voigt (2007) also proposed a typology of homicide-suicides based on U.S data. Based on variables measuring the relationship between offender and victim, the motivation of the offender, type of fatal injury, location of the event and characteristics of the offender and the victim, five types were identified: Intimate or domestic lethal violence-suicide; Family annihilation-suicide; Mercy killing-suicide; Public killing spree-suicide; and Mistaken or accidental homicide-suicide. The Intimate or domestic lethal violence-suicide was characterised by homicides taking place between intimate partners, most commonly a male partner against a female partner, where most cases involved the use of a gun. The offender was often unemployed and the homicide-suicide often seemed unplanned. The Family annihilation-suicide type was most commonly committed by a family member against another relative, most often a child, was often planned and included both female and male offenders. The Mercy killing-suicide type was most commonly committed by older (75 years and older) offenders against victims of a similar age where the victim was suffering from a chronic critical illness. The Public killing spree-suicide was characterised most commonly by male offenders, often occurring in workplace or schools. The last type of homicide-suicides described by Wood Harper & Voigt (2007) was the Mistaken or Accidental Homicide-Suicide, which was characterised by a mistaken homicide, followed by the suicide of the offender due to the guilt of the crime. These categories bear some resemblance to the typology developed by Douglas et al., (1992/2006) but are in contrast based on several different variables rather than just the motive of the offender. Although homicide-suicides are considered rare, many of the variables used by Wood Harper and Voigt (2007) are used in the development of other homicide typologies. This would suggest that some of the variables used in these typologies have been found relevant in other, more common types of homicide and might therefore be useful for the current study.

Table 3.1: Homicide typologies based on victim, offender and incident variables

Typology	Name of types	Classifying variables ¹⁹
Bijleveld & Smit, 2006	Business/personal; and Personal-settlement- Impersonal escalation/Angry Brawl	(<i>Motivation of the offender; Relationship to victim²⁰</i>); Offender characteristics; Victim characteristics; Method of killing; Locus; Previous criminal record; Premeditation
Morton et al., 1998	Type I; Type II; Type III	Offender characteristics, Victim characteristics; Relationship to victim; Method of killing; Motivation of the offender; Presence of other victims; and Locus
Pridemore & Eckhardt, 2008	Neither drinking; Offender drinking; Victim drinking; and Both drinking	(<i>Intoxication</i>); Offender characteristics; Victim characteristics; Relationship to victim; Method of killing; and Context (day, time, season).
Pizarro, 2008	Domestic; Drug; Robbery; Interpersonal Dispute; and Other	(<i>Motive</i>); Offender characteristics; Victim characteristics; Relationship to victim; Method of killing; Locus; and Context (day, time, season)
Wood Harper & Voigt, 2007	Intimate/Domestic; Family Annihilation; Mercy Killing; Public Killing Spree; and Mistaken/Accidental	Offender characteristics; Victim characteristics; Relationship to victim; Method of killing; Motivation of the offender; and Locus

¹⁹ These variables were summarised into these more general themes.

²⁰ Variables put in brackets indicates that these variables were used to define typologies *a priori*.

Pridemore and Eckhardt (2008) developed a typology of homicide events in a Russian context based on alcohol use of both the offenders and victims. Four types were identified: Neither Participant Drinking; Offender Drinking; Victim Drinking; and Both Drinking. These types were then compared on 11 variables measuring victim, offender and event characteristics (Pridemore and Eckhardt, 2008). The findings showed that there were significant differences between all four types of homicide events, but also between alcohol and non-alcohol related homicides. Alcohol-related homicides were more likely to occur at night, on weekends, and to result from acute arguments, and less likely to occur between strangers, to be profit motivated, to be premeditated, and to be committed in order to hide other crimes. Pridemore and Eckhardt consequently found that the distribution of several homicide characteristics on the incident level varied significantly based on the absence or presence of alcohol, which would strongly suggest that alcohol is an important variable when disaggregating homicide.

Similarly to Pridemore and Eckhardt (2008), Pizarro (2008) examined the situational covariates of different homicide subtypes based on U.S data. The subtypes had already been classified *a priori* into four groups based on the motive of the offender: Domestic homicide, Drug homicide, Robbery homicide and Interpersonal Dispute homicide. The Domestic homicides occurred in the context of abuse from a family member or intimate partner, and were most likely to occur within a residence. Both the victim and offender tended to be slightly older than average and the victim was most commonly male, although this type included a higher number of female victims compared to the other types. The Drug homicides were most commonly committed on a public street, predominantly involving men who were friends or acquaintances, and committed in the context of the sale or distribution of illegal drugs. The Robbery homicides, committed in the context of a robbery, also tended to be committed in public. This type of homicide was most commonly committed between strangers, and both the victim and offender were predominantly male. Similarly to the Robbery homicides, the Interpersonal Dispute homicides were most commonly committed between male friends or acquaintances, in a public, outdoors setting and the number of victims and offenders being intoxicated by drugs or alcohol was higher than average in this type.

This type of homicide was committed in the context of some sort of dispute that was not drug-related or committed by an intimate partner or family member. The final type Pizarro (2008) identified was the type labelled Other, including all remaining homicides, which also most commonly occurred in public, very often included a gun, and were most commonly committed between male friends and acquaintances. Although many of these types were quite similar, they differed based on the motivation of the offender. Pizarro utilised variables measuring aspects of the homicide event (such as the location of the homicide or weapon used), the time of the homicide (such as the season and time of day), and characteristics of both the offender and the victim in order to examine the situational covariates of homicide subtypes. The findings revealed that there in fact were differences among the subtypes regarding the temporal, event, and victim and offender characteristics, which confirm the need to examine homicide in a disaggregated manner (Pizarro, 2008).

Table 3.2: Classifying variables in typologies in table 3.1

Victim variables (n studies)	Offender variables (n studies)	Incident variables (n studies)
Age at time of crime (4)	Age at time of crime (4)	Method of Killing (5)
Gender (4)	Gender (5)	Relationship between offender and victim (5)
Employment status (3)	Employment status (3)	Motive (5)
Ethnicity (4)	Ethnicity (4)	Locus (5)
Influenced by alcohol or drugs (2)	Influenced by alcohol or drugs (4)	Premeditation of the offence (1)
Residential status (1)	Residential status (1)	Context (Day, time or season) (2)
Previous criminal record (1)	Previous criminal record (2)	
Victim precipitation (2)	Suicide of the offender (2)	
	Mental illness (1)	

Lastly, Smit, Bijleveld and van der Zee (2001) created a typology of 11 types of homicide incidents based on both the motive of the offender and the relationship

between the offender and the victim: Criminal Background (divided into contract killing, drug-related and other); Sexual; Robbery; Dispute or a fight (divided into intimates, acquaintances and strangers); Psychotic; Other; and Unknown. This typology was then explored further by Bijleveld and Smit (2006), who used multiple correspondence analysis to examine the relative position of 17 variables measuring the relationship between the offender and victim, cause of death, event location and offender and victim characteristics. Bijleveld and Smit then examined the positions of the homicide cases and variables in relation to the 11 types of homicide previously identified. The authors found that although homicides can be structured meaningfully, the homicides could not be separated into clearly defined categories or types, but should rather be interpreted dimensionally along two axes interpreted as business/personal and personal settlement-impersonal escalation/angry brawl. Although Pridemore and Eckhardt (2008), Pizarro (2008) and Bijleveld and Smit (2006) all used homicide typologies that had been developed *a priori*, the findings in all three studies showed that the situational covariates examined differed between the subtypes. This suggests that both the variables used to classify the homicides as well as the situational covariates examined would be relevant to include in a typology of homicide cases.

There are consequently several variables relating to the victim, offender and the incident of homicide that are relevant for the current study when disaggregating homicide. As mentioned, only five typologies were based on variables measuring all three of these aspects, which are arguably essential in order to examine homicide fully. As can be seen from table 3.2, a total of 23 variables were identified as important across these five studies. Although the types derived were quite different, the variables on which the types were based were strikingly similar. Although this raises questions regarding the validity (both internal and external) of the types themselves, the repeated inclusion of these variables has demonstrated their value and relevance when disaggregating homicide. These 23 variables will therefore be used as a starting point for the choice of classifying variables in the current study. The next section will examine previous literature on non-lethal violence typologies.

3.4.2 Violence typologies

Although homicide typologies are well developed within the literature (see for instance Chan & Heide, 2009), the same cannot be said regarding typologies of non-lethal violence. Due to the much higher number of acts of violence compared to homicide, the violence typologies identified in previous research tend to be highly specialised, as can be seen with the typologies of sexual violence or domestic abuse (see for instance Cavanagh & Gelles, 2005; Chambers, Horvath & Kelly, 2010; Holtzworth-Munroe, 2000; Johnson, 2006; Messinger, Fry, Rickert, Catalozzi, & Davidson, 2014). For instance, Mayhew and Chappell (2001) identified three different types of occupational violence labelled: External violence; Client-initiated violence; and Internal violence. External violence was a type of violence committed by people external to the workplace, such as armed hold-ups in shops, whereas Internal violence was committed between employees of an organisation, and were often repeated incidents. Client-initiated violence was defined as occupational violence initiated by the clients of the employee and could occur when the client was under the influence of alcohol (Mayhew & Chappell, 2001). Although interesting, this typology only encompasses violence occurring at the workplace, excluding all other forms of violence. Other violence typologies have focused on non-lethal violence among young men. For instance, McMurrin, Jinks, Howells and Howard (2009) identified three types of alcohol-related violence among young men based on the ultimate goal of the violent act in an English sample; 'Violence in pursuit of non-social profit-based goals' (such as robbery), 'Violence in pursuit of social dominance goals', and 'Violence as defence as response to a threat'.

In other words, there are typologies for very specific forms of violence but all-encompassing typologies including more general aspects of non-lethal violence, are lacking. Due to the comparative rareness of the crime, homicide typologies on the other hand tend to be more exploratory in nature. It was therefore decided to use the variables identified as relevant in homicide typologies (see table 3.2) as a starting point for choosing the classifying variables for the violence typology as well, for two main reasons. Firstly, more general homicide typologies have been developed, encompassing all types of homicide, whereas violence typologies tend to be more

specialised. Secondly, as discussed in the previous section, there are homicide typologies based on variables relating to the victim, the offender and the incident, aspects which are all of interest in the current study. Most violence typologies, however, tend to be focused on the offenders.

3.5 Chapter Conclusions and Research Aim:

The current and previous chapters have examined previous research about trends in homicide and violence as well as previous research relating to typologies of lethal and non-lethal violence. Theories relating to homicide and violence have also been examined as well as the policy context for violence in Scotland. This review of the previous literature has led to the following five conclusions:

- 1) The exact relationship between homicide and violence is not known and there are two aspects that need to be examined if the relationship between homicide and violence is to be understood; the similarities or differences between the characteristics of homicide and violence, and the similarities or differences in the trends between these two crimes.
- 2) Scotland was chosen suitable for this study for three main reasons: firstly, the relationship between homicide and violence has never been examined in Scotland; secondly, Scotland has been described as one of the most violent countries in the developed world, despite the fact that very little research at all has been conducted regarding homicide and violence in this country, and finally; Scotland has very rich sources of data which has seen previous limited use.
- 3) If the nature of this relationship is to be understood, subtypes of both crimes needs to be identified before the change in these subtypes should be examined over time.
- 4) Two branches of theoretical perspectives will be used to analyse findings of the current study: crime opportunities theories and cultural theories. These were chosen for two main reasons: firstly, these theories provide an explanation of the relationship between crime trends as well as the characteristics for homicide and violence. Secondly, both of these theories have been extensively

linked to the relationship between homicide and violence in previous research and policy literature.

- 5) Due to the fact that more all-encompassing typologies of homicide have been developed compared to non-lethal violence typologies, building on variables relating to the victim, to the offender and to the incident, the 23 variables identified as important when disaggregating homicide will be used when identifying typologies of both homicide and violence in the current study.

In light of these conclusions, the current thesis aims to examine the changing characteristics and patterns of homicide in Scotland and to determine the extent to which changes in homicide reflect the changing characteristics and patterns in wider violence. To fulfil this aim, the following research questions will be answered:

- 1) What subtypes of homicide with similar characteristics can be identified?
- 2) What subtypes of wider violence with similar characteristics can be identified?
- 3) How has the mix of homicide subtypes changed over time?
- 4) How has the mix of violence subtypes changed over time?
- 5) How does the change in homicide subtypes reflect the overall change in violence subtypes, if at all?

The following two Chapters will therefore move on to discuss the data as well as the methods used in the current study. Chapter 4 will describe the research design as well as the datasets used and the coding procedure around the variables identified as important in the current Chapter.

Chapter 4: Research Design and Establishing the Datasets

4.1 Introduction

The preceding two chapters have examined previous research, theory and policies relating to homicide and violence in Scotland as well as outlined the aims and research questions of the thesis. This chapter will provide a description of the research design utilised in the current study in order to fulfil those aims, and define the datasets used. Firstly, the aim described in Chapter 3 is reviewed with a more detailed description of the overall research design. This will be followed by a description of the two main datasets used in the study, the homicide dataset and the violence dataset, including how these were established, coded, recoded and utilised in the study.

The homicide data was gathered from the Scottish Homicide Database held by Police Scotland and, due to the hierarchical nature of the dataset, it will be argued that the best way of examining this data was to initially divide it into three separate datasets; one dataset with the victim variables, one dataset with the offender variables and one dataset with the incident-level variables, before a multilevel model was run on an offender-based dataset. This will be followed by a discussion of the missingness in the homicide data where it will be argued that a 16-year dataset (2000-2015) should be used in favour of the full 26-year dataset (1990-2015) due to the pattern of missing data. The violence data was gathered from a pooled dataset created by the Scottish Government containing five sweeps of the Scottish Crime and Justice Survey (2008-09 to 2014-15). It will be argued that these two datasets constituted the best data sources available to fulfil the aims of the study. The Chapter starts by describing the research design of the study.

4.2 Research Strategy and Design

As outlined in previous chapters, this research aims to examine the changing characteristics and patterns of homicide in Scotland and to determine the extent to which changes in homicide reflect the changing characteristics and patterns in wider violence. To fulfil this aim, five research questions were outlined, described in section 3.5 in Chapter 3. This study began with a problem; a lack in the knowledge of the

relationship between homicide and wider violence. In order to understand this relationship, and to begin to solve this problem, data was gathered, examined and analysed before conclusions and generalisations were drawn based on this data. The subtypes identified were data-informed, and not limited to previous types already identified in previous research. This study is therefore explorative and inductive in nature, and is more theory-generating than theory-testing. This was reflected in the explorative and descriptive nature of the research questions mentioned in Chapter 3 (section 3.5), and was based on the lack of knowledge about the relationship between the characteristics and trends in homicide and violence. An exploratory research strategy offers new insights into the relationship between homicide and violence as well as the possibilities of new generalisations about these trends in a way that a deductive approach would not. As such, the research questions mentioned above should not be regarded as hypotheses to be tested but as tools to fulfil the exploratory aim of the study. Although the discussion part of the current thesis allows for some analysis of *why* the results were found, the thesis is explorative in nature, aiming to answer questions of ‘what’ and ‘how’. Since the proposed aim requires the summation of information of thousands of cases, as well as an examination of how the mix of these cases have changed over time, the research strategy employed in the current thesis was quantitative in nature.

To answer the research questions, data on both homicide and violence was required. Ideally, information regarding both homicide and violence would be collected from the same data source, however, survey data of violent victimisation, which is considered most reliable since it is less affected by changes in reporting and recording compared to for instance police recorded data (McAra & McVie, 2012; Tonry, 2014; Van Dijk et al., 2007), excludes homicide, and rich, detailed police data on homicide, such as the Scottish Homicide Database (SHD), does not contain information about wider violence. Instead, two different datasets were used in the current study: the SHD and the Scottish Crime and Justice Survey (SCJS). Although police recorded violence could have been used instead of survey data, it was decided that the increased reliability of the survey data was preferable, even if this meant using two different datasets instead of one.

There are furthermore many advantages that secondary data analysis brings to the research. Firstly, more time could be spent on data analysis since less time was spent on data collection. Secondly, the sample sizes from both datasets were considerably larger than if primary data collection had been conducted. Thirdly, not only would primary research on violence be ethically difficult as well as time consuming in this particular instance, but any such research would most likely not be able to match the quality of the SCJS (see section 4.4 below). The homicide dataset is in effect a population dataset, or n=all (Connelly, Playford, Gayle & Dibben, 2016), containing all homicides conducted in Scotland that came to the attention of the police over the relevant time period, meaning that the SHD is a comprehensive dataset of homicide available in Scotland. The use of administrative data, although previously limited in Scotland (McVie et al., 2008), has furthermore been acknowledged to provide impactful social research of high quality (Connelly et al., 2016). Considering the details of the current study, secondary analysis was arguably more favourable and practical than primary data collection.

The following section will provide a more detailed description of the two main datasets used in the current study; the SHD and the SCJS.

4.3 The SHD – the homicide dataset

The homicide data was gathered from the Scottish Homicide Database (SHD), which is a live operational database held by Police Scotland. The SHD is held by the Homicide Governance and Review team at the Gartcosh Crime Campus which deals with all unresolved and undetected homicide cases. A homicide is considered to be resolved by Police Scotland if someone has been convicted of the crime or if someone is serving time in jail or in a mental institution. If the offender committed suicide or died before trial, the case could still be considered resolved if there is enough evidence that the offender killed the victim. Unresolved cases, on the other hand, refer to cases that are any of the following: the case remains undetected (as in no suspect is discovered); the case is considered detected but no further proceedings have been made; the case is awaiting trial; the case has proceeded to trial where the offender was

found not guilty or the case was found not proven. The SHD contains extensive information (see Appendix 4.1 and Appendix 4.2) about all homicide cases coming to the attention of the police in Scotland, going back to the 1940s²¹. However, based on advice given by individuals working with the SHD, only homicides from 1990 and onwards were examined due to the high levels of missingness in the data before this year, as will be explained in the following section. In total, there were 2400 cases of homicide from 1990 to 2015 in Scotland. In order to contextualise the development of the SHD, the following section will briefly describe the history of this database.

4.3.1 The development of the SHD

The SHD was developed and expanded over a number of years. The first step of what would become the SHD was during the Police Operation Trinity in the early 2000s, which involved the creation of a database including all female homicides occurring in Scotland from the 1960s and onwards. This database was developed in order to support the investigation of a specific cold case referred to as the World's End Murders²². Operation Trinity later evolved into Operation Phoenix, which was an investigation conducted by the legacy Strathclyde Police in collaboration with the Violence Reduction Unit. The database was extended to include all homicides committed in Scotland, not just homicides involving female victims, and was created as a tool to help identify similar cases across different forces in Scotland and to review unresolved cases. The data collection of Operation Phoenix took place between 2003 and 2009. After 2009, the database was retained under various names until it was renamed the Scottish Homicide Database in 2012. Today, it functions as a live system, accessible by any police officer working within Scotland, linking together all aspects of a case, from the suspects to the victims to the evidence found at the scene and post mortem reports (see Appendix 4.1).

As mentioned, the SHD includes homicide cases from as early as the 1940s and encompasses all significant deaths that have occurred in Scotland, including homicides, culpable homicides, corporate homicides and unexplained deaths. The data

²¹ The earliest recorded homicide is from June 1942.

²² For more information about this case, please see Wood & Johnston (2008).

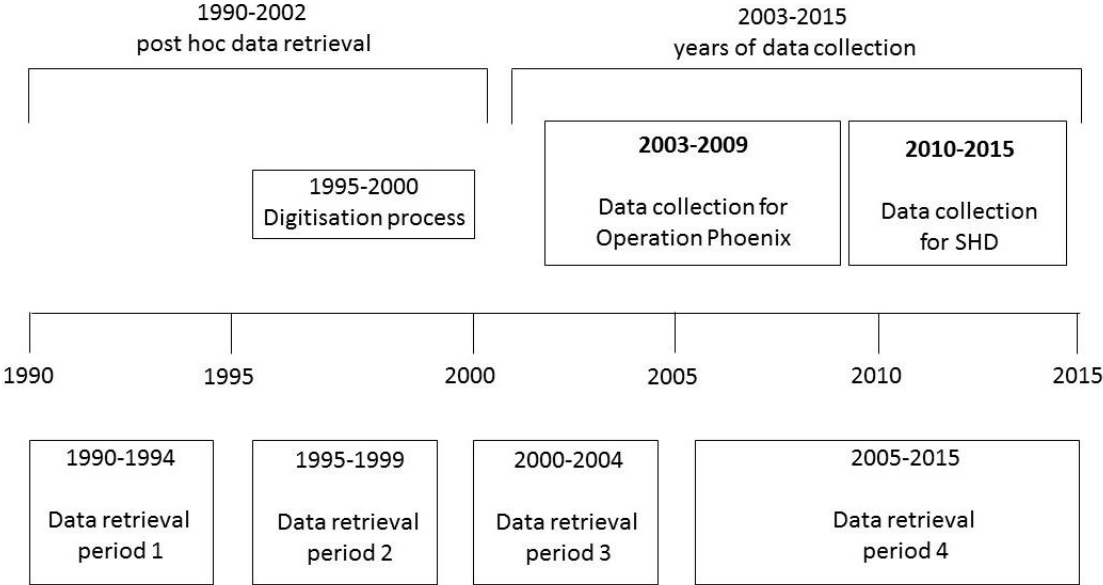
collection was based on the police case files, information found in HOLMES²³, Crown Office²⁴ records, and death certificates. As mentioned, the main bulk of the data was collected during Operation Phoenix, between 2003 and 2009. During this collection period (2003-2009), data was however retrieved slightly differently depending on when the homicide had occurred. As will be explained, the data retrieval for the database can therefore roughly be divided into four time periods: 1990-1994; 1995-1999; 2000-2004; and 2005-2015 (see figure 4.1).

When the dataset was developed in 2003-2009, the first two data retrieval periods (1990-1994 and 1995-1999) were collected post hoc, which means that some information of these homicide cases were irretrievable at time of data collection. The digitisation process of the record system across the legacy police forces was not initiated until 1995, and this process was not finalised until 2000. Since this process occurred at different speeds across the different forces there were also some inconsistencies in accessibility of the records at the first and second retrieval periods. This meant that information about any case that occurred before 1995, and some cases before 2000, had to be retrieved and coded manually during the data collection process. Additionally, there was no great consensus between forces on how to code certain variables before the year 2000. This was particularly true regarding variables considered to be more 'subjective' in nature, such as motive or whether or not the offender was under the influence of drugs or alcohol. Overall, this meant that the missingness was considerably higher in the first (1990-1994) and second (1995-1999) retrieval periods compared to the later retrieval periods of the dataset.

²³ HOLMES (Home Office Large Major Enquiry System) is the information storage and retrieval system used by all police departments in the UK (Brookman, 2015:274; Holmes2, 2017). It allows for storage, indexing and cross-referencing for all major enquiries.

²⁴ The Crown Office and Procurator Fiscal Service is the prosecution service in Scotland, responsible for the decision of prosecuting someone based on reports about crime filed by the police and other crime reporting agencies (Crown Office, 2017a).

Figure 4.1: Illustration of the data collection process for the SHD.



The third retrieval period (2000-2004), which was the first retrieval period of the dataset to occur during the time of data collection (2003-2009), was characterised by lower levels of missingness compared to the first two retrieval periods, for two main reasons. Firstly, the legacy police forces became better and more consistent at recording the data at this time²⁵, and secondly, the complete digitisation of the database at this time meant that case files could be digitally searched for and accessed. This meant, for instance, that post-mortem reports could be retrieved for this retrieval period, which reduced the amount of missing data in variables such as cause of death (see section 4.3.8 below). Police Scotland also conducted interviews with detectives and police officers who had worked on unresolved cases during this retrieval period in an attempt to remedy some of the missingness in the data. This was however not done for all cases, and not for all variables. Unresolved cases were prioritised over resolved cases, even when some of the resolved cases included missing variables, and demographic variables and cause of death was prioritised over other variables such as motive and alcohol influence.

²⁵ On April 1st 2004 the Scottish Crime Recording Standards were implemented, leading to greater coherence in recording and counting of crimes and offences (Police Scotland, 2016), which also contributed to greater consistency between cases and forces.

The data in the fourth and final retrieval period (2005-2015) of the dataset was collected during the end of Operation Phoenix (2003-2009) and the beginning of the establishment of the SHD. This meant that all homicide cases that occurred during this time were reviewed, not only unresolved ones. This retrieval period also had the most consistent data collection process with considerably lower levels of missingness compared to the other time periods. This retrieval period (2005-2015) also demonstrated a higher level of consistency in coding, both between individual police officers as well as between forces, which led to a greater robustness of the variables. The reliability in coding was also enhanced by the initiation of Police Scotland in 2013. The data in the fourth retrieval period (2005-2015) was continuously updated on both old and new cases to ensure that the SHD was up to date with all the cases it contained. This also included going back to old records and re-entering missing information in the SHD system. Overall, this means that the SHD is the most comprehensive and detailed data source of homicide in Scotland. The SHD can therefore be considered as time-series data, and in effect be considered a population dataset of homicide rather than a sample.

The SHD database also includes unresolved homicide cases. Of all the 2400 cases of homicide, about a fifth remained unresolved (21.3%, n=512). Similar to the study by Polk (1994), a case will in other words be counted as a homicide even though the offender may be found not guilty further down the line in the criminal justice process. Since some of the cases included in the SHD might still be awaiting trial, some cases might not be considered homicides after being tried in court.

Although the SHD is a live dataset when used by Police Scotland, meaning that the data is constantly being updated, the data extracted for use in the current study is static, meaning that it only contains the information that was available during data collection for the current study, which was conducted between 31st of March 2015 and 7th of April 2016. Any possible updates to these cases that occurred after the last date of data collection will consequently not be included in the current study. The following section will describe the process of getting data access and ethical approval for the use of the SHD database for the current study.

4.3.2 Data access and ethics

As mentioned, the main focus of the current research was homicide in the wider context of violence. Since no other database in Scotland includes more information about homicide than the SHD, Police Scotland was approached early on to discuss possible data access. Police Scotland proved enthusiastic about the idea and a data sharing agreement (see Appendix 4.3) was negotiated and developed. Ethical considerations of the research are part of any major research project. Although the use of secondary data analysis prevents certain ethical issues, it is of utmost importance for users of administrative data to follow the conditions of any data access agreement, outlining the restrictions and usage of the data (Connelly et al., 2016).

The data extraction process occurred in several steps. For security purposes, the researcher had to travel to the Gartcosh Crime Campus, Scotland's centralised multi-agency hub, where specialised investigations to tackle serious and organised crime are conducted, in order to access the database. Over a period of a few weeks, the researcher then extracted the relevant data (all homicide cases that Police Scotland labelled as murders committed²⁶ between the 1st of January 1990 and the 31st of December 2015²⁷) and ensured that this data was anonymised by excluding all names of the offenders, victims and witnesses and all street addresses mentioned in the data. The data was then extracted into several excel spread-sheets. The excel spread-sheets, containing the anonymised relevant data, were transferred onto an encrypted USB-stick by Police Scotland, before the data was physically transported to the University of Edinburgh where it was transferred to a password-protected folder on the university secure server. Before any of the data was collected, a University of Edinburgh Level 1 Ethics form was filled out and approved, covering both the homicide data and the violence data (see Appendix 4.4). Great care was taken at every step to ensure that the anonymity of the cases was maintained, and the data was not shared with anyone not included in the data sharing agreement. The data was extracted in two sweeps; the first sweep took place in July 2015 and included the main bulk of the data and the second sweep took place in April 2016 and included the last six months of the 2015 data. Contact has been

²⁶ The date used is the committed date of the homicide, not the reported date.

²⁷ The Dunblane school shooting case was excluded from this dataset due to the unusual circumstances around the crime and the high number of victims.

maintained with Police Scotland for the full duration of the research to ensure that all data has been handled in accordance with the data sharing agreement.

When the main homicide dataset had been extracted from Police Scotland, the recoding and restructuring work could begin in full. The following section will describe the process of this restructuring of the dataset and why it was necessary.

4.3.3 Constructing a case-based master dataset

In total, the homicide dataset extracted from the Gartcosh Crime Campus included 2400 homicide cases committed between 1st of January 1990 and 31st of December 2015. As mentioned, every homicide case may involve information about multiple offenders and multiple victims. This hierarchical structure of the data meant that the data had to be restructured in a number of ways in order to get detailed information about all three of these levels (the victims, the offenders and the incidents). When the dataset was first extracted from the SHD, the information was initially stored in a person-based data system, meaning that each row contained information about each person involved in any case (both offenders and victims). This meant that the dataset was very long rather than wide. The extracted information was furthermore all in text format and many of the variables (such as motive or weapon used) included a high number of possible categories which prohibited parsimonious analysis of the data.

It was initially decided that a wide, case-based dataset, which would provide an overview of all three aspects of a homicide case, should be created as a starting point for the analysis. This restructuring was conducted in several steps. Firstly, the data was restructured to make the homicide incident the unit of analysis rather than the individuals involved. This was done by assigning each person a unique reference number that indicated whether they were a victim or an offender as well as what specific case this person was associated with. Since any case could include multiple offenders as well victims, the process of assigning these unique reference numbers was somewhat cumbersome. Each person was initially given a number depending on the number of victims or offenders in any given case. For instance, in the cases involving only one victim, the victims were all given the number one (i.e 'victim1'). If there was

more than one victim, the second victim was given the number two (ie 'victim2') etc. This was also done with the offenders. These numbers were assigned at random and did not indicate the most prominent victim or offender in the case²⁸. All of these new victim and offender labels were subsequently merged with the corresponding incident number (which was a unique reference number for any homicide case) in order to create a unique reference code for each person within any particular case (for instance '0001victim1').

Once this unique personal identifier had been created, information about all individuals involved in the homicide cases could be merged into a new case-based master dataset. This meant that each row represented a unique homicide case which contained information about all relevant individuals involved in that case. The case-based master dataset was subsequently transferred into SPSS in order to enable further and more sophisticated analysis. All variables were recoded into numeric variables in order to be able to process the information statistically. During this stage, some of the values were also recoded or merged for convenience. For instance, all missing values were coded into '-99' in order to indicate that these were missing. Likewise, values that were misspelled were merged. Some of the categories of the variables with excessive categories (such as motive or weapon) were also collapsed during this process.

As intended, this resulted in a very wide master dataset which included information about all three aspects of the homicide case, thus providing an overview of the general aspects of homicide in Scotland over this time. Although the master dataset was never used for analysis in the current study, this dataset constituted the base from which all the other datasets were constructed. A description of some of the general features of the master case-level dataset follow below.

²⁸ The reason this process was conducted at random was that once the data was anonymised, all the names were removed from the data, making it impossible to cross-reference the names of the main offenders/victims to the relevant case.

4.3.3.1 General variable information of the master case-level dataset

This section will provide some descriptive information about the master case-level dataset of homicide, including the indictments²⁹ of the crime, where the homicides took place, the categorisation of homicide and the number of victims and offenders across the different cases. As previously mentioned, the master dataset included 2400 cases of homicide. The vast majority of cases had the same indicted classification at the time of trial as the original recording of the crime; murder (see table 4.1). In about 5% of the cases, the indicted offence was however changed by the time the case went up to trial. When the indictment was changed, it was most commonly changed to culpable homicide.

Table 4.1: Indictments of the homicide cases

Indictment	Number	Percent
Murder ³⁰	2274	94.8%
Culpable homicide	109	4.5%
Common assault	5	0.2%
Serious assault	4	0.2%
Road traffic act	2	0.1%
Other	6	0.3%
Missing	0	0.0%
Total:	2400	100%

Note 1: Source: SHD. Base: n=2400.

Before April 1st 2013, Police Scotland consisted of 8 different police forces. Since the initiation of Police Scotland, these 8 police forces have been divided into 13 Police Scotland Divisions. In order to get a consistent measure of where the homicides were committed over time, the 143 cases that were committed since the 1st of April 2013 were merged into the 8 old police forces (see Appendix 4.5). As can be seen, the

²⁹ The indictment is the document which details the charges which the accused will face in court (Crown Office, 2017b).

³⁰ This includes all cases that remained unchanged from recorded crime to indictment, and n=142 cases which were appealed and changed into murder after indictment.

majority of the murder cases were committed in Strathclyde, the police force area with the largest estimated population (see table 4.2) A little more than a tenth of the cases were committed within the force of Lothian and Borders, another 6% were committed in Tayside and another 5.5% were committed in the Grampian force. As can be seen from table 4.2, the larger the population estimate, the more crimes were committed.

Table 4.2: Distribution of homicide cases in each legacy police force

Police force	Number	Percent	Population estimate³¹
Strathclyde	1551	64.6%	2 219 290
Lothian and Borders	309	12.9%	957 080
Tayside	143	6.0%	415 470
Grampian	132	5.5%	333 040
Fife	91	3.8%	402 600
Central	74	3.1%	294 430
Northern	63	2.6%	385 880
Dumfries and Galloway	36	1.5%	149 520
Other ³²	1	0.0%	-

Note 1: Source: SHD. Base: n=2400.

Homicides in Scotland, and in the rest of the UK, are divided into three categories depending on the scale, gravity and complexity of the homicide (Brookman, 2005). These categories are: A (homicide enquiries of grave public concern or where the community impact assessment is high, for instance if the victim is a child); B (homicide enquiries in which the offender is unknown but otherwise a routine enquiry); and C (homicide enquiries where the identity of the offender is apparent at an early stage). As can be seen from table 4.3, this variable contains a high level of missingness where this information could not be retrieved from older casefiles. Despite this, the distribution of the three categories has been found to be roughly representative

³¹ The population estimates are based on reported figures from Police Scotland (Police Scotland, 2017a) and the National Records of Scotland (NRS, 2017b).

³² See Appendix 4.5.

of the whole dataset (Police Scotland, personal communication, July, 2015). The category of homicide will determine which resources should be allocated to any particular case, including the number of police officers working on the case (Brookman, 2015). As can be seen from table 4.3, when this was known, the vast majority of cases was of category C.

Table 4.3: Homicide categorisation

Category	N (%)	Valid Percent
A (homicide enquiries of grave public concern)	78 (3.3%)	14.1%
B (homicide enquiries in which the offender is unknown but otherwise a routine enquiry)	72 (3.0%)	13.0%
C (homicide enquiries where the identity of the offender is apparent at an early stage)	403 (16.8%)	72.9%
Missing	1847 (77.0%)	-
Total:	2400	100%

Note 1: Source: SHD. Base: n=2400.

Table 4.4: Number of offenders and victims in homicide cases

Number of offenders	N	Percent (%)	Number of victims	N	Percent (%)
Uncertain	24	(1.0%)	1	2361	(98.4)
1	1735	(72.3%)	2	32	(1.3)
2	392	(16.3%)	3	7	(0.3)
3	139	(5.8%)			
4	68	(2.8%)			
5 or more	48	(1.8%)			
Total:	2400	100%		2400	100%

Note 1: Source: SHD. Base: n=2400.

Table 4.5: Cross-tabulation of number of victim and offenders

Number of offenders (% of total cases)	Number of victims (% of total cases)			Total:
	1 victim	2 victims	3 victims	
Uncertain	22 (0.9%)	2 (0.1%)	0 (0.0%)	24 (1.0%)
1 offender	1713 (71.4%)	19 (0.8%)	3 (0.1%)	1735 (72.3%)
2 offenders	383 (16.0%)	7 (0.3%)	2 (0.1%)	392 (16.3%)
3 offenders	136 (5.7%)	2 (0.1%)	1 (<0.0%)	139 (5.8%)
4 offenders	65 (2.7%)	2 (0.1%)	1 (<0.0%)	68 (2.8%)
5 or more offenders	42 (1.8%)	0 (0.0%)	0 (0.0%)	42 (1.8%)
Total:	2361 (98.4%)	32 (1.3%)	7 (0.3%)	2400 (100%)

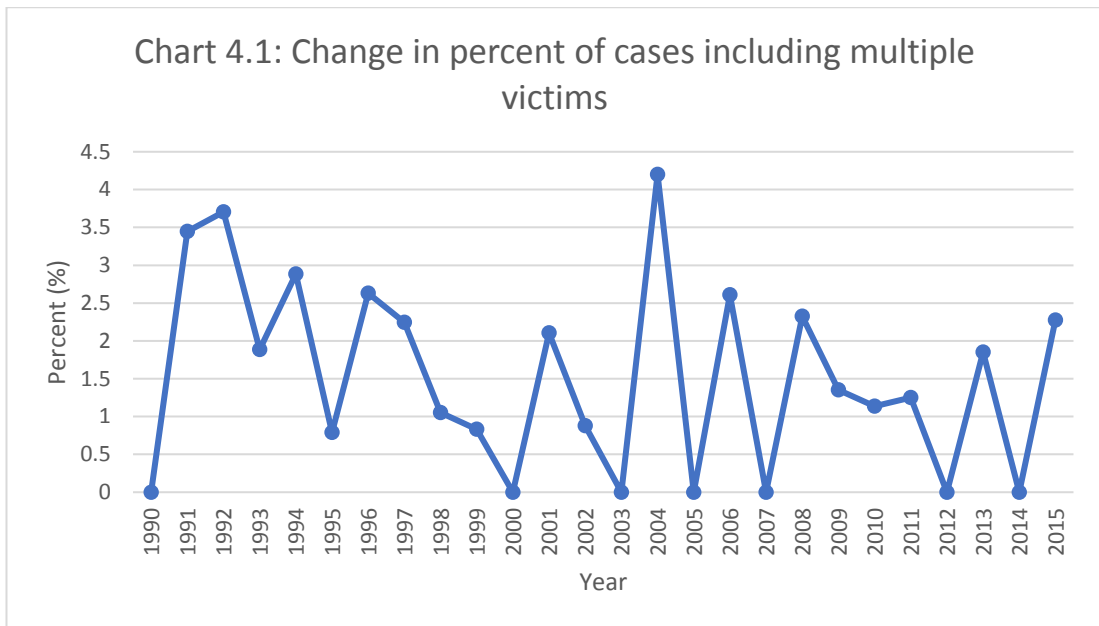
Note 1: Source: SHD. Base: n=2400.

Variables that summarised the number of offenders and victims in each case were created. As can see from tables 4.4 and 4.5, the number of victims ranged between 1 and 3 and the number of offenders ranged between 1 and 13, although the majority of cases included one victim and one offender. In 1% of all cases the offender was uncertain³³. In those cases, the offender variables were all treated as missing. Overall, it seemed to be more common for a case to include multiple offenders than multiple victims.

As can be seen from charts 4.1 and 4.2, the cases including multiple victims and offenders do not appear to have increased over time. Due to the fluctuation in the percentage of cases with multiple victims over time, no particular trend over time could be discerned. When the trend in multiple offenders was examined (see chart 4.2), there appears to be a gradual increase in cases including multiple offenders between 1990 and 2009, followed by a sharp decrease from 2010-2015, ending in a percentage lower than the first year examined. It is important to note the scale differences between chart 4.1 and 4.2; since it was much more common for a case to include multiple offenders

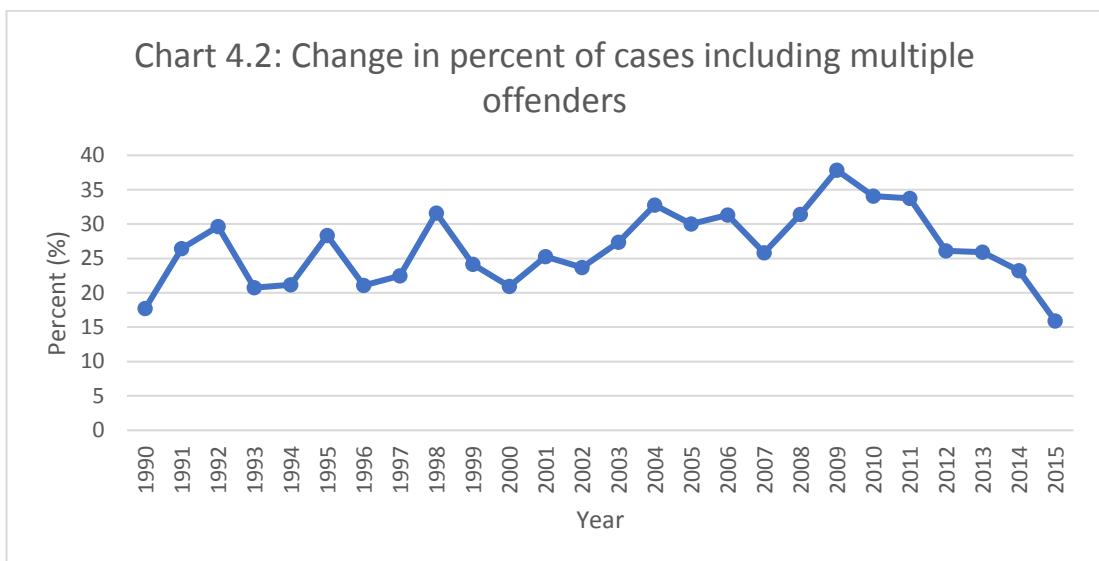
³³ ‘Offenders’ refers to the corresponding ‘Accused’ in the SHD. Consequently, there might be known suspects in these 24 cases but not any accused.

than multiple victims, it is easier to discern a trend in multiple offenders. As can be seen from these charts, there was however no clear pattern regarding the trend in multiple victims or multiple offenders over time.



Note 1: Source: SHD. Base: n=2400.

Note 2: The percent was calculated by dividing the number of cases including multiple victims by the total number of cases for any given year.



Note 1: Source: SHD. Base: n=2400.

Note 2: The percent was calculated by dividing the number of cases including multiple offenders by the total number of cases for any given year.

4.3.3.2 The creation of multiple datasets

At this point, the master case-level dataset included all 2400 cases of homicide and contained the information about all individuals involved in these cases. This however meant that due to the wide structure of the dataset, the cases also included a high number of missing values since not all cases included multiple victims or multiple offenders. If a case did not have more than one offender, there would still be variables indicating information about a second offender, but all of the values in these variables would be missing. This rendered the dataset very difficult to work with. Either, the cases included very detailed information about the individuals involved in the cases but included a lot of missing values, or summarised variables were used which meant that some information about the individuals was lost. In order to address this issue, it was decided to analyse the offenders, the victims and the incident variables separately with three corresponding datasets. Since every case could include multiple victims as well as multiple offenders, this was the only way of obtaining detailed information about all three of these aspects without losing overall information. These three datasets will therefore be described in more detail below, starting with the victim dataset.

4.3.4 The victim dataset

In order to enable more detailed analysis of all the victims involved in homicide, a dataset where the victim was the unit of analysis was constructed. Every row in the victim dataset consisted of a unique individual who was a victim of homicide, regardless of whether there were multiple victims involved in each case. The victim dataset consisted of 2446 victims over 2400 cases of homicide, and the homicides were committed between 1st of January 1990 and 31st of December 2015.

Table 4.6: Classifying variables of the LCA victim models

Victim variables	Missing (n)	Missing (%)
Gender (Male/Female)	0	0%
Age at time of crime (6 age groups ³⁴)	0	0%
Influenced by alcohol or drugs (Sober/Under the Influence)	1825	74.6%
Ethnicity (White/ Not white)	829	33.9%
Homelessness (Homeless/ Not homeless)	1372	56.1%
Employment status (Unemployed/ Not unemployed ³⁵)	1721	70.4%

Note 1: Source: SHD. Base: n=2446.

As discussed in Chapter 3, eight classifying variables relating to the victim were identified as relevant in previous typology research (see table 3.2). Out of those eight variables, six could be found in the SHD (see table 4.6). Neither the variable ‘previous criminal record’ nor ‘victim participation’ were available in the SHD and were therefore not included in the current study. All of the six variables included were constructed as binary variables with the exception of age (see Chapter 6 for descriptive information). The variable measuring whether the victim was under the influence of alcohol or drugs at the time of the crime was originally measured by two separate variables in the data but these were combined into one single measure. This has been done in previous studies (see for instance Holtzworth-Munroe & Stuart, 1995), and it was decided to do so for both the victim and the offender in both the homicide and violence models in the current study in order to keep the models as parsimonious as possible. The models already included a large number of variables (see tables 6.1, 6.4 and 6.7) and since it can be argued that these two variables measure a very similar construct (offender being intoxicated by some sort of substance) it was therefore decided to combine these two variables into one.

³⁴ Age Group 1: Under 16 years old; Age Group 2: 16-30 years old; Age Group 3: 31-45 years old; Age Group 4: 45-60 years old; Age Group 5: 61-75 years old; Age Group 6: 76 and older.

³⁵ Not unemployed includes Employed and Other (which include students, people at school and people who are retired). For sake of simplicity, this will henceforth be described as ‘employed’.

This dataset was subsequently submitted to LCA modelling (see Chapter 6). As can be seen from table 4.6, the pattern of missingness was quite substantial. Some variables, such as Influenced by alcohol or drugs and Employment status, had more than 70% missing. This is problematic for a number of reasons and will be discussed further in section 4.3.8.

4.3.5 Offender dataset

An offender dataset was also constructed to enable more detailed analysis of the offenders. Every row represented an individual offender in any given case. A case that included three offenders would for instance be represented by three rows in the offender dataset. Some offenders might be involved in multiple cases, meaning that they have committed more than one homicide over time. These individuals, although they are the same individuals, will be represented by different rows relating to the particular case. Some offenders might therefore be represented more than once in the dataset if they were involved in more than one homicide case over time³⁶. The offender dataset consisted of 3458 offenders over 2400 cases of homicide, and the homicides were committed between 1st of January 1990 and 31st of December 2015.

As described in Chapter 3, nine classifying variables relating to the offender were identified as relevant in previous typology research (see table 3.2). Out of these nine variables, seven were present in the SHD dataset (see table 4.7). Chapter 6 will present descriptive analysis of these variables. Both the variable ‘previous criminal record’ as well as any information relating to the mental health of the offender, were unavailable in the SHD and were therefore not included from the current study. As with the victim dataset, this dataset was subsequently submitted to LCA modelling (see Chapter 6). As can be seen from table 4.7, missingness was quite prominent in certain variables, such as Influence by alcohol or drugs and Employment status. As with the victim dataset, this pattern of missingness will be discussed further in section 4.3.8.

³⁶ This would for instance be the case with serial killers. Since the data is anonymised it was not possible to ensure that all offenders represented a unique individual. However, repeat homicide for any individual was very rare.

Table 4.7: Classifying variables of the LCA offender models

Offender variables	Missing (n)	Missing (%)
Gender (Male/Female)	0	0.0%
Age at time of crime (6 age groups ³⁷)	0	0.0%
Influenced by alcohol or drugs (Sober/Under the Influence)	2861	82.7%
Ethnicity (white/ not white ³⁸)	974	28.2%
Homelessness (Homeless/not homeless)	1903	55.0%
Employment status (Unemployed/ not unemployed ³⁹)	2187	63.3%
Suicide of offender (Suicide/No suicide)	0	0.0%

Note 1: Source: SHD. Base: n=3458.

4.3.6 Incident-level dataset

The incident-level dataset was based on the same level as the master dataset that was originally created. The variables were recoded into a series of binary variables to allow for multiple responses. This was done since any case could have more than one offender and/or victim and consequently have multiple responses in any given variable. As described in Chapter 3, six classifying variables relating to the incident of homicide were identified as relevant by previous typology research (see table 3.2). Out of these six variables, four classifying variables were used in the current study (see table 4.8). See Chapter 6 for descriptive analysis of the incident-level classifying variables. The variable ‘premeditation of the offence’ did not exist in the SHD, and the ‘context’ variable, relating to the time, day or season of the homicide, included too much missing data to be valuable (see section 4.3.6.1). These two variables were therefore excluded from the current study. As with the other two datasets, missingness in certain variables was still very high (see table 4.8). This will be discussed in section

³⁷ Age Group 1: under 16 years old; Age Group 2: 16-30 years old; Age Group 3: 31-45 years old; Age Group 4: 45-60 years old; Age Group 5: 61-75 years old; Age Group 6: older than 75 years old.

³⁸ The variable ethnicity was identified by Police Scotland and not by the offender themselves.

³⁹ Not unemployed includes employed and other (which include students, people at school and people who are retired). For sake of simplicity, this will henceforth be described as ‘employed’.

4.3.8 along with the missingness in the other two datasets. Below follows a description of the coding process for some of the variables included in the incident-level dataset.

Table 4.8: Classifying variables of the LCA incident models

Case variables	Missing (n)	Missing (%)
Method of Killing (8 variables) ⁴⁰	400	15.2%
Relationship between offender and victim (6 binary variables)	1270	52.9%
Motive (9 binary variables)	554	23.1%
Locus: Rural or urban location (1 multinomial variable)	1656	69.0%
Locus: Public or private (1 multinomial variable)	1133	47.2%
Locus: Inside or outside (1 multinomial variable)	1190	49.6%

Note 1: Source: SHD. Base: n=2400.

4.3.6.1 Coding procedure for classifying variables for the incident-level dataset

When the incident-level classifying variables from the master dataset were recoded into binary variables to allow for multiple responses, categories with less than n=20 observations were combined into another category for parsimony. For instance, Drowning as a Method of killing was combined into the ‘other’ category since Drowning only included n=17 (see table 4.9). Some categories were combined for substantive reasons, although these variables had more observations than 20. The relationship variables ‘relative’ and ‘parents’ were for instance combined even though relative had n=60 observations since these two types of relationships were deemed to be similar enough to warrant merging.

Due to the high correlation between these two variables, it was also decided to combine the variables Cause of death and Type of weapon into a new variable called Method

⁴⁰ This variable does not have the same amount of missing since it was combined by the variables weapon (n=364 missing) and cause of death (n=400 missing). The number of missing values in this variable therefore ranges up to n=400, which is the largest of these two figures.

of killing (see table 4.9). Having two sets of binary variables for each of these measures meant that they essentially were measured twice in the subsequent modelling (see Chapter 5), giving disproportionate weight to the weapon and cause of death. See table 4.9 for a full description of the Method of killing variable.

Table 4.9: Breakdown of Method of Killing

Method of Killing	Includes	Missing (n)	Missing (%)
Sharp or stabbing	The use of a sharp weapon or stabbing as cause of death	356	14.8%
Blunt instrument	The use of a blunt instrument or blunt instrument as cause of death	359	15.0%
Firearm or Shooting	The use of a firearm of shooting as cause of death	363	15.1%
Strangulation	The use of a ligature or strangulation or asphyxiation as cause of death	361	15.0%
Fire	Fire as cause of death	400	16.7%
Assault	Physical assault as cause of death	400	16.7%
No weapon	No weapon used	364	15.2%
Other	The use of a weapon classified as ‘other’ or ‘other’ as cause of death, also includes drowning	354	14.8%

Note 1: Source: SHD. Base: n=2400.

Note 2: Since Method of killing was a combined measure of two variables (Cause of death and Type of weapon), some Method of killing variables which consisted of both variables, such as ‘Sharp instrument or Stabbing’, were less likely to be missing compared to Method of killing variables which only consisted of one of the two variables, such as ‘No Weapon’.

A variable measuring the relationship between the victim and the offender of any particular case was created based on multiple sources of information. Even though the relationship between offender and victim had been coded by analysts at the Homicide Governance and Review Team between 2013-2015, the homicides committed prior to 2013 did not include this variable. The relationship variable consequently had to be

constructed manually to amend for this missingness (see Appendix 4.6 for description of sources used).

Consideration was given to include a variable measuring the time of day which the homicide took place in the incident-level dataset since this variable had been mentioned in previous literature (Pridemore & Eckhart, 2008). However, as with other variables (see section 4.3.8), this variable included very high levels of missingness. Additionally, there was some error in the coding of this variable in the SHD, where many cases were coded as being perpetrated at 00:00 hours. In light of this, the variable Time of day was excluded. Another variable called Evidence destruction was initially included in the incident-level dataset, but was subsequently excluded. This variable was a combined construct consisting from several different variables in order to measure whether or not the offender had attempted or succeeded in destroying any evidence at the scene of the crime. This included the following: whether the body had been moved more than walking distance from the place of the murder; whether the body was covered but not buried; whether the body had been buried; whether the body had been burned; and/or whether the body had been dismembered. If any of these variables were present, this variable was coded as present. Out of all 2400 cases, this type of evidence tampering was only evident in 80 (3.3%) of the cases⁴¹. When the incident-level LCA model was run, this variable failed to distinguish between the classes. Moreover, the models that included the variable Evidence destruction had difficulty converging. When the variable Evidence destruction was removed, the model converged more easily and model fit was improved. The incident-level dataset, without the variable Evidence destruction, was subsequently submitted to LCA modelling (see Chapter 6).

As previously mentioned, the construction of three separate datasets for the offenders, victims and incident-related variables was the best identified way to analyse these three sets of variables in more detail. However, in order to fulfil the overarching aim of the study, all three elements of homicide needed to be examined simultaneously in order

⁴¹ Due to the way this variable was coded, and to the rarity of the variable, the no/missing categories were combined, and no missing value can therefore be given for this particular variable.

to compare a typology of these variables with a violence typology based on the same three aspects. In other words, these three datasets had to be combined in order enable this type of analysis. The next section will describe the creation of such a dataset.

4.3.7 Offender-based two-level dataset

A number of different ways to combine the three datasets were considered before an offender-based dataset with the victim variables summarised to the case level was decided to be the best solution for the data. The case-based master dataset contained more detailed information about all three aspects of the homicide cases than any of the other datasets created but, as previously mentioned, the wide nature of this dataset made it very difficult to analyse in a meaningful way. For that reason, a decision was made to summarise one of the three levels in the dataset to the incident level, essentially turning the three-level hierarchical structure of the data into a two-level structure. The choice of summarising the victim variables was made on the basis that there were considerably more offenders than victims in the dataset (3458 offenders versus 2446 victims). Even though this meant a slight loss of information regarding the victims, it was considered the best alternative. Not only did this method make the dataset more manageable, but the modelling also became more parsimonious (since a two-level structure was used instead of a three-level structure). A one-level structure could have been modelled as well using the incident-level dataset and summarising the information about offenders and victims at the case level, but this would mean a significant loss of information about the offenders. It was therefore decided that the two-level hierarchical structure, where the offenders were nested within the incidents (which also included summarised information about the victims) would be the best data structure to most appropriately represent the data.

The information about the victims was summarised to the case level by creating a series of binary variables regarding the relevant classifying variables. This meant for instance that gender was measured by two variables; ‘was there a male victim in this case?’ and ‘was there a female victim in this case?’ There was also a variable measuring the number of victims in each case. The offenders then became the unit of analysis in this new, long dataset, where all the case and victim information was

repeated for each offender. The offenders were then nested within the cases in the multilevel LCA that followed, creating a two-level LCA model with the offenders as the within level and the incidents (including victim information) as the between level (see Chapter 5 for more detail). A shortened version of this dataset was also created due to the nature of the missingness in the data (see section 4.3.8). This shortened two-level dataset only included the data from 2000 to 2015, and is referred to as the 16-year dataset.

A number of different homicide datasets was consequently used in the current study. The Victim, Offender and Incident-level datasets are all described in detail in Chapter 6. The Offender-based two-level dataset was the dataset used for the multilevel LCA modelling described in Chapter 7. Although this might appear as a complicated way for conducting the analysis, as mentioned, it was decided that this was the best way to obtain detailed information about the victims, the offenders and the incident-level variables of homicide before combining these three levels together. Since there was an issue with high levels of missingness in all of the homicide datasets, separate analysis of these different datasets proved vital in gaining a better understanding of the missingness as well as the data overall. The following section will discuss the issue of missingness in the homicide dataset in more detail.

4.3.8 Missingness

Due to the construction of the SHD dataset, there was an issue with missingness in the homicide dataset (see section 4.3.1). When examining missingness, scholars usually talk about three different mechanisms of missingness: Missing Completely at Random (MCAR); Missing at Random (MAR); and Missing Not at Random (MNAR) (Graham, 2009; Tabachnick & Fidell, 2013). If the data is MCAR, the missingness is unpredictable and does not depend on any of the data you have, observed or unobserved. MCAR is generally regarded as the best form of missingness since it is, as the name would suggest, completely missing at random. Data that is MAR is predictable from other variables in the data since it is dependent on observed data (Graham, 2009; Tabachnick & Fidell, 2013). If the data is either MCAR or MAR it is regarded as ignorable non-response. If the data is MNAR however, it is regarded as

non-ignorable. This is because the data in MNAR is dependent on the unobserved data; on the very variable you want to measure. This is problematic since MNAR data, unlike MCAR and MAR, yields biased parameter estimates and therefore distorts the results. Moreover, if the mechanisms of missingness is unknown, then the degree of bias is also unknown. The pattern of missingness of the data consequently has important implications for the analysis.

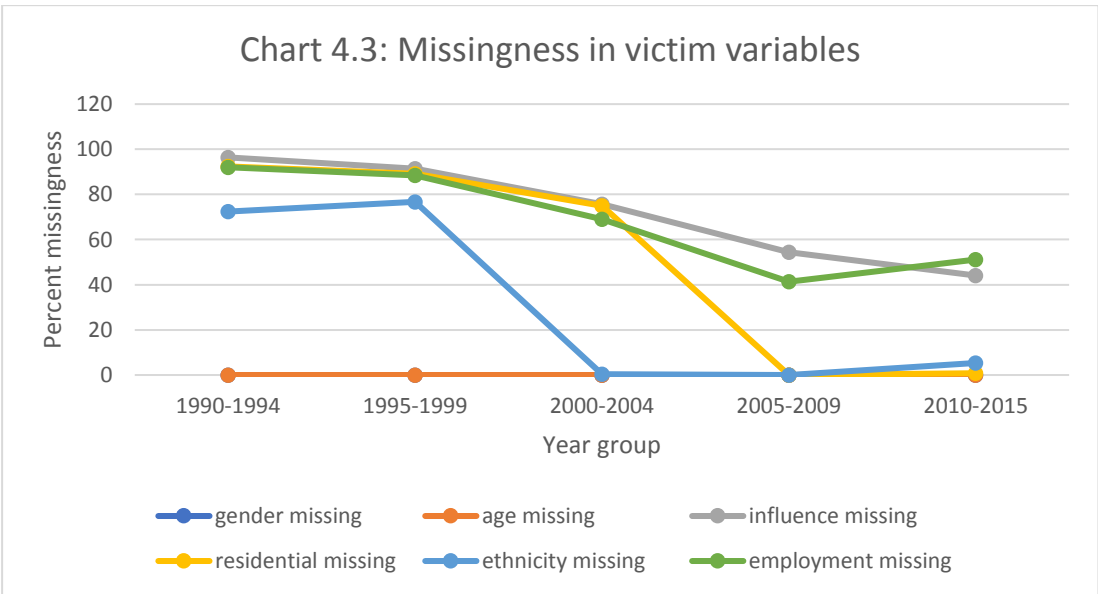
As described in previous sections, different time periods in the SHD have different levels of missingness, with an indication of earlier years in the data suffering from more missing values than the later years due to inconsistencies in the digitisation process of the forces as well as recording issues. This is problematic for several reasons. Firstly, if the missingness is decreasing over time, other variables might appear to be increasing or decreasing when this might just be an effect of the decreased missingness, skewing the results. For instance, the variable Urban or Rural location went from having 83% missing in 1990-1994 to 46% missing in 2010-2015, and the percentage cases occurring in urban locations increased from 16% to 51% during this time. This appears to be a massive increase in homicide occurring in urban areas, but in fact, this is more likely to reflect a great reduction in the missingness over this time period.

Secondly, variables that include high levels of missingness risk skewing the LCA model since the model uses the available information to estimate the missing information. If a variable has 70% missing for instance, this means that less than a third of the values are used to estimate the rest. Thirdly, the general validity and reliability of the models are diminished if the variables contain high levels of missingness. Since the majority of the values are unknown in such an estimation, there is no way of determining the accuracy or generalisability of the results.

Extensive measures were taken in order to diminish the missingness in the data (see appendix 4.6 for a full list of amended variables). This included manual recoding of certain variables based on the information given by Police Scotland. For instance, due to certain coding practices it was made known to the researcher that certain variables

were falsely coded as missing. As an example, when victim and offender ethnicity was other than white, this was systematically coded, however, if the ethnicity was white, the police might not always have coded this. Cases where this variable was missing could therefore be recoded into ‘white’ for the last three-year groups when the coding practices were stricter and more consistent (see section 4.3.1 for more information). Similarly, missing values in the variable ‘Type of weapon’ (a variable merged with cause of death in the current study to create the variable Method of killing) in the last three-year groups could be recoded into ‘no weapon used’. Moreover, the synopsis provided for each homicide was manually searched in order to fill in any additional information known about the case to diminish the missingness. Information such as this proved vital to diminish the missingness in the data, however despite these efforts, missingness still remained a problem.

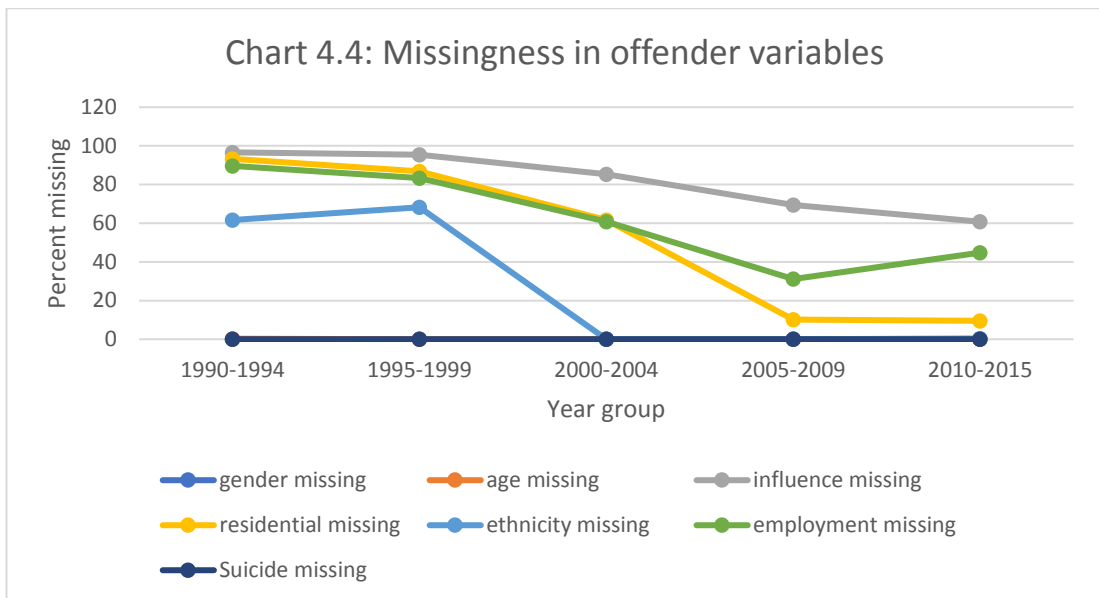
Further examinations of the pattern of missingness was therefore required. The missingness in all the variables on the victim, offender and incident levels were therefore examined and plotted against time in order to see if there was a relationship between missingness and time and what this relationship looked like.



Note 1: Source: SHD. Base: n=2446.

Note 2: For definition of each variable see section 4.3.5.

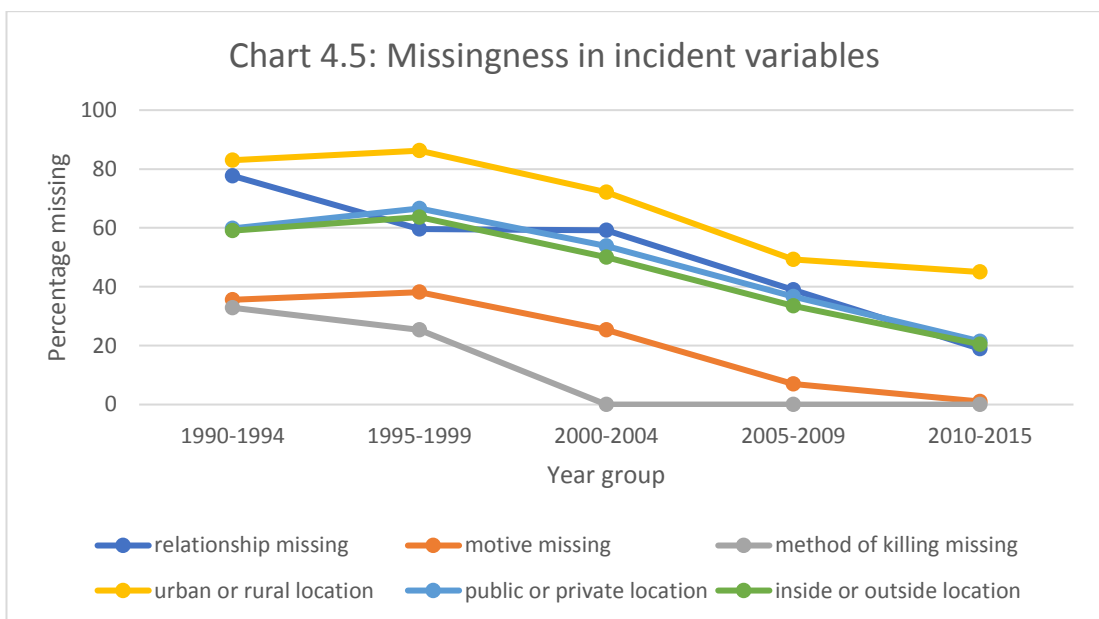
Note 3: Percentage missing was calculated based on the number of homicide victims per year group.



Note 1: Source: SHD. Base: n=3458.

Note 2: For definition of each variable see section 4.3.6.

Note 3: Percentage missing was calculated based on the number of homicide offenders per year group.



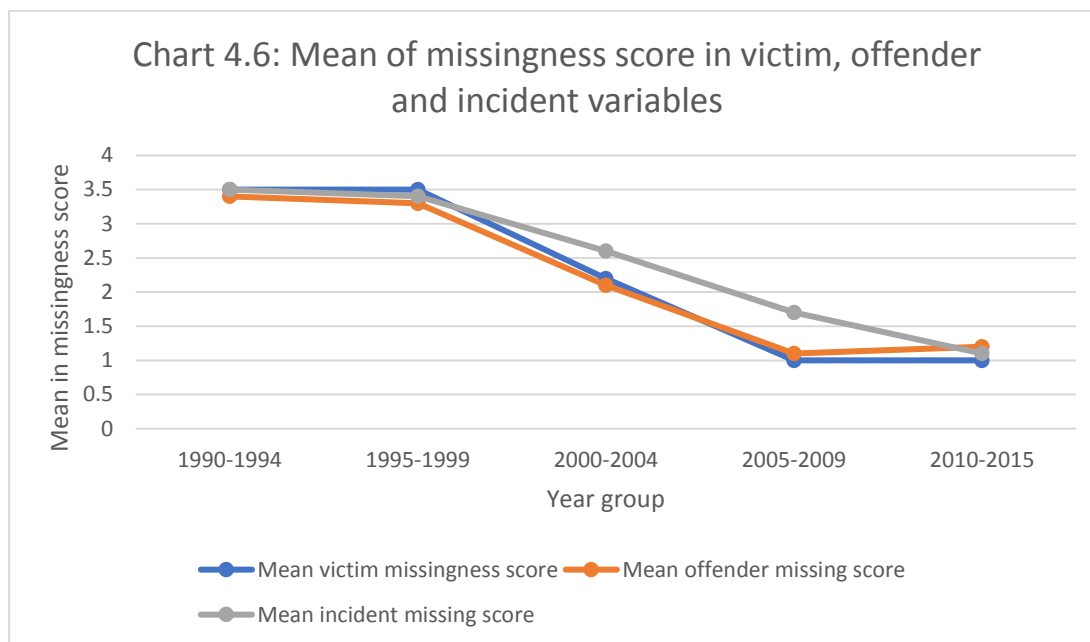
Note 1: Source: SHD. Base: n=2400.

Note 2: For definition of each variable see section 4.3.7.

Note 3: Percentage missing was calculated based on the number of homicide cases per year group.

As can be seen from charts 4.3-4.5, there are different levels of missingness in the different variables examined, ranging from 0% missingness in the both victim and offender gender to closer to 80% in some of the variables (such as urban or rural

location). There also appears to be a negative relationship between time and missingness in the dataset.



Note 1: Source: SHD.

Note 2: Means were calculated based on a missingness score derived from each dataset. The missingness score of victims ranged from 0-4, the missingness score of offenders ranged to 0-5 and the missingness score of the incident variables ranged from 0-6.

In order to examine the pattern of missingness even further, a missingness score was calculated for each dataset, reflecting the number of variables that was missing for each victim, offender or incident (see chart 4.6). A higher missingness score indicated more missingness in the data. The mean of this missingness score was then plotted against time by dividing the 26 years into roughly even year groups (1990-1994; 1995-1999; 2000-2004; 2005-2009; 2010-2015). This was done to provide a picture of the average missingness over time in each dataset. Like the previous graphs, this also indicated a negative relationship between missingness and time. In fact, when the correlation between the missingness score and the time groups was examined, this negative relationship also appeared significant for the victim dataset ($\rho = -0.73^{42}$), the offender dataset ($\rho = -.70^{43}$) and incident dataset ($\rho = -0.45^{44}$) alike. The highest

⁴² Spearman's $\rho = -.73$, $n=2444$, $p < 0.01$.

⁴³ Spearman's $\rho = -.70$, $n=3458$, $p < 0.01$.

⁴⁴ Spearman's $\rho = -.45$, $n=2400$, $p < 0.01$.

missingness scores appear to be centred on the early years in the data, and the first two year groups in particular. The data in the current study could therefore be considered to be MAR. This, since the pattern of missingness has a strong negative relationship with time. In other words, the missingness of the data in the current study is dependent on observed, not unobserved, data and the missingness in the current study will therefore be considered ignorable non-response.

As mentioned, even though the missingness is considered to be MAR, the high levels of missingness still remained a problem since any potential change over time in these variables might just reflect the decreased missingness in the data rather than constituting an actual change. Since the aim of the thesis was to examine changes in both homicide and violence over time, solving this problem was vital. As a solution, it was decided to remove the first two year groups (1990-1994 and 1995-1999) from the data when running the two-level model (see Chapter 7). Although this meant a loss of information as well as loss of the long-term change in trends, the missingness prevalent in the first two year groups was too problematic. Many of the variables were not recorded during the earlier years of the dataset simply because the police did not have time or did not think it important. Additionally, some of the variables were coded slightly differently in the earlier years in the data compared to the later years. For instance, residential status of the victims was almost always recorded in the first two year groups if the victim's home address was the same as the crime scene due to how the data system was set up. If the home address was different than the crime scene however, this variable was sometimes falsely coded as missing. This means that the variable 'residential status' had a slightly different meaning in the later years of the data compared to the earlier ones. Influence status of both the victim and offender was similar due to different definitions of what being under the influence really meant. It was therefore decided to use the 16-year dataset, spanning from 2000-2015 when running the two-level homicide model. This dataset included n=1978 offenders over n=1344 cases.

The two-level model was initially also run with the whole 26-year dataset (1990-2015) in order to compare these results to the the shortened 16-year dataset (2000-2015) (see Chapter 7). As was discovered, the two-level model of the 16-year dataset

demonstrated considerably better model fit and substantive interpretation over the two-level model of the 26-year dataset. Additionally, the classes identified were slightly different. Due to the improved validity of the 16-year model, it was therefore decided to use the shortened 16-year dataset for the two-level models even though this meant that the results could only be generalised to the time period between 2000 and 2015.

The missingness of the variables included in the 16-year two-level dataset was therefore considerably lower compared to the whole 26-year dataset. One variable, offender influence, was however still problematic in regards to missingness (see table 7.1, Chapter 7). In order to ensure the validity of the model, it was decided that any variable with more than 60% missing (which was considered to constitute the majority) would be excluded from the model. When the shortened 16-year dataset was modelled, this led to the exclusion of the variable Influence status among offenders (72.9% missing).

This section along with the previous sections of this Chapter has outlined and described the homicide dataset. The next section will provide a description of the other dataset used in the current study; the violence dataset.

4.4 The SCJS – the violence dataset

As mentioned, two main types of data sources were necessary for the research: one data source of homicide and one of violence. Two datasets were chosen since these datasets (the SHD and the SCJS) constituted the most reliable data sources for each crime. Victimization data was chosen over police recorded data for violence since victimisation data generally is considered most reliable and less affected by changes in reporting and recording (McAra & McVie, 2012; Tonry, 2014; Van Dijk et al., 2007). The Scottish Crime and Justice Survey (SCJS) is a repeated cross-sectional self-reported victim survey administered by the Scottish Government, aimed to measure the levels of crime and victimisation in Scotland (Scottish Government, 2016e). The survey includes measures of property crime and violent crime, including sexual crime,

based on approximately 3000 to 16 000⁴⁵ face-to-face interviews with individuals aged 16 and older. Although the SCJS was launched in its current state in 2008-2009, Scottish crime surveys have been available since 1993, albeit with slightly different methodology (Scottish Executive, 2002; 2004; 2007; Scottish Government, 1998; 1999; 2009; 2010b; 2011b; 2014f; 2016f), making comparisons beyond 2008-09 rather difficult. For this reason, only SCJS data from 2008-09 and onwards was included in the current study (see section 4.4.1).

The sampling design for the SCJS has differed slightly over time (Scottish Government, 2009; 2010b; 2011b; 2014f; 2016f). In the 2008-09, 2009-10 and 2010-11 sweeps, the sampling design for the SCJS was mostly unclustered, with clustering only occurring in rural areas to accommodate more sparsely populated areas of Scotland. In the following two sweeps (2012-13 and 2014-15) however, the survey used a completely unclustered design. Police force areas were used as strata (or subgroups to be sampled from) in the sweeps before the implementation of Police Scotland in 2013 (2008-09; 2009-10; 2011-12; 2012-13), and the Police Scotland Divisions were used as strata for the 2014-15 survey sweep. Data from the SCJS is accessible from the UK data service⁴⁶ and subject to strict disclosure control. The data is therefore anonymised and as a data source it is frequently used by academics (Scottish Government, 2017f).

The SCJS is divided into different sections, including a main questionnaire (which includes perceptions of crime and demographic information), a victim form section (including information about any crimes the person might have experienced), and different modules asking about perceptions about various areas (for instance their local community or sentencing) (Scottish Government, 2016e). Since the experience of violent crime was of relevance for the current study, the victim forms were the main sections used from the different sweeps for this research, along with demographic information retrieved from the main questionnaires. Normally, all of these sections have to be retrieved individually for each survey sweep before being merged together

⁴⁵ This figure changes from sweep to sweep.

⁴⁶ Retrieval at: <https://www.ukdataservice.ac.uk/>

to constitute a dataset, however in the case of the current research there was already such a dataset in place. The Scottish Government has recently constructed a pooled dataset consisting of the victim forms and demographic information about the victims of five sweeps (2008-09; 2009-10; 2010-11; 2012-13 and 2014-15). This pooled dataset is not publicly accessible as of yet⁴⁷ but was made available for analysis for the researcher through a Scottish Government internship at Justice Analytical Services. The aim of this internship was to identify different types of violent crime in Scotland and to examine how these have changed over time from 2008 to 2015, which resulted in two forthcoming reports (Skott, forthcoming 2018a; Skott, forthcoming 2018b). The data sharing agreement for the internship (see appendix 4.7), also stated that the data and analysis could be used for the current thesis. As with the homicide data, ethical considerations had to be taken when conducting research on the violence dataset. For instance, due to the sensitive nature of violent victimisation, sharing experiences of this kind can be very painful, which in worst case scenario even could lead to secondary victimisation of these crimes (Campbell & Raja, 1999). The use of secondary analysis of survey data however avoids these issues. Using secondary data has ethical issues of its own, however. It is for instance important that none of the individuals constituting the sample can be identified, as well as ensuring that none of the conditions of the original data collection is violated. It is of utmost importance that users of survey data follow the conditions of any data access agreement, outlining the restrictions and usage of the data (Connelly et al., 2016).

The following section will describe the pooled dataset used for the analysis of violence in the current study.

4.4.1 The pooled dataset

As mentioned, the pooled dataset consisted of five survey sweeps: 2008-09; 2009-10; 2010-11; 2012-13; and 2014-15. An initial effort to expand the violence dataset by including three more sweeps was attempted (the 2000; 2003; and 2005-06 sweeps), however, the design of these surveys differed in such a way that merging the sweeps proved too problematic. Many survey questions were asked in a different way in the

⁴⁷ At least not when this was written at submission on the 16th November 2017.

earlier years of the survey compared to the later years, including offender age, influence status of the offender, residential status of the victim, the relationship between the offender and the victim and whether the victim had experienced any sexual victimisation. These differences proved too comprehensive for a merger of the datasets to be possible, and it was therefore decided not to include any additional SCJS sweeps prior to the 2008-09 survey. Although this meant that the violence dataset would not cover the same time period as the homicide dataset, it was still considered favourable to including sweeps in the violence data that would effectively dilute the validity of the variables. It was therefore decided to only use the pooled dataset developed by the Scottish Government as the violence dataset for the current study.

Like the homicide dataset, the violence dataset was hierarchical in structure. However, the hierarchical structure was slightly different compared to the homicide data. In the SCJS, any victim can report more than one crime. That means that the crimes (or incidents) were nested within the victims in the violence dataset. In order to account for this hierarchical structure, the violence data was also subjected to multilevel modelling, just like the homicide dataset. However, in contrast to the homicide dataset, the within-level in the violence data was constituted by the incidents and summarised offender variables, whereas the between-level was constituted by the victim variables (see chapter 5 and 8). This essentially meant that there were two different datasets for violence; one victim-based dataset and one incident-based dataset. The incident-based dataset also included information about the offenders, since the victims were asked to describe the offenders for each separate crime. Out of the two datasets, the incident-based dataset was the most useful for the current study because it included detailed information about every violent crime that was reported in the data, which the victim-based dataset did not. If the victim-based dataset was to be used, the incidents had to be summarised, which would mean inevitable loss of information. It was therefore decided to use the incident-based dataset and cluster the incidents within the victims, which would ensure that the hierarchical structure in the data would be taken into account. The victim-based dataset was only used in the study to provide an appropriate description of the victim-level variables (see Chapter 8, section 8.2.1).

It is also important to note that the number of crimes reported per victim was capped at five. This means that if a victim was subjected to more than five different and unrelated incidents of violence, this would not be recorded in the dataset. In addition, any victim could report multiple instances of the same type of crime, measuring whether the incident was a repeat offence in a series or a one-off violent crime. The variable measuring repeat victimisation was dichotomised into a binary variable in the current study, measuring whether or not the violent crime was a repeated offence, and not how many times this offence was repeated. This was decided for parsimony of the subsequent modelling. A continuous variable measuring the number of repeat instances would complicate the model, and risk volatility of results over time due to a low number of victims experiencing high numbers of repeat victimisation (Walby, Tower & Francis, 2016). Although this choice omits certain aspects of victimisation, risking skewing the results, (Walby et al., 2016), whether or not the violence was more than a one-off occurrence was of more substantive interest than the exact number of repeated incidents.

Although the violence data was divided into two different datasets, as mentioned, only the incident-based dataset was used for the LCA modelling. This meant that no single-level models of the violence data were conducted. Furthermore, the change in valid percent of the classifying variables (such as was done for the homicide data in Chapter 6) was not examined for the violence data. There are three main reasons for this: firstly, since the main focus of the research was homicide in the wider context of violence and the violence modelling was conducted for comparative reasons, less space and time was given to the analysis of the violence dataset. Secondly, the missingness was considerably lower in the violence dataset compared to the homicide dataset (see section 4.3.8). For this reason, examining the change in valid percent in the variables over time before conducting the LCA modelling was less relevant for the violence data. Thirdly, although the single-level models of homicide were helpful to guide the choice of classifying variables as well as the optimal number of classes for the multilevel LCA, the violence LCA modelling was designed to be as similar as possible to the homicide dataset within the limits of the violence dataset. This meant that although there were some discrepancies between the variables in the two datasets (see

section 4.4.3 below), the classifying variables in the violence model were chosen with the homicide model in mind. For these three reasons, only the incident-based dataset was modelled for the violence data and no single-level models were run.

The sample size varied between the sweeps of pooled dataset, ranging from 11 500 interviews in 2014-15 to 16 000 in the 2008-09 and 2009-10 sweeps respectively (see note 4 of chart 4.7). Since the pooled dataset consisted of multiple sweeps of the SCJS survey merged together, it was important to ensure that none of the larger sweeps had more influence in the results of the analysis. To do this, the statisticians at the Scottish Government constructed a specific weight for the pooled dataset of violence. The following section will outline exactly how this weight was constructed.

4.4.2 Creating the pooled weight

In order to make sure that the pooled dataset was representative of Scotland overall, the data was weighted to correct for the unequal probability of selection for interview caused by the sample design and for differences in the response level among groups of individuals. This is normally done in all the survey sweeps separately, but due to the nature of the pooled dataset, a specific pooled weight needed to be calculated to take the effective sample size of each sweep into account.

Taking the sample design into account in complex, multilevel surveys is notoriously complicated and there is a debate in the literature between researchers favouring a model-based approach, where the sample design is incorporated into the model, or a design-based approach, which uses the application of weights (Korn & Graubard, 1995; Snijders & Bosker, 2011). Researchers favouring a model-based approach argue that if the model is true, the sampling design can be considered independent from the residuals in the model, meaning that the sampling design becomes irrelevant (Snijders & Bosker, 2011). Taking this sampling design into account by the use of weights therefore means a loss of efficiency (Kish, 1992; Snijders & Bosker, 2011). Researchers in favour of the design-based approach, however, argue that one can never be certain that the model is true, and that the sampling design therefore cannot be seen as independent from the model residuals (Snijders & Bosker, 2011). This means that

the model might be biased or even worthless, and that weights need to be applied in order to take the sampling design into account (Snijders & Bosker, 2011). There are various ways to construct weights and apply them to the data (see for instance Longford, 1996; Korn & Graubard, 1995; Pfefferman, Skinner, Holmes, Goldstein & Rasbash, 1998; Rabe-Hesketh & Skrondal, 2006) and in some instances, the weighting of multilevel data has led to biased results, changing the parameter estimates and standard errors (Carle, 2009; Korn & Graubard, 1995; Pfefferman et al., 1998). This, in turn, might lead to different inferential decisions depending on whether weights are applied (Carle, 2009). In other words, depending on whether the weights are applied or not, the effects of the classifying variables might differ and different types might be identified in the data. Other studies have however found that there is very little difference between weighted and unweighted multilevel modelling data (Carle, 2009).

With this in mind, the chosen violence model (see Chapter 8) was rerun without any weights applied for comparison. Although the fit statistics of the unweighted model were slightly inferior to the weighted model, both the within-level classes and the between-level classes were virtually the same in both models. Seeing that the weights did not change the model or demonstrated worse model fit, a decision was made to use the weighted model in the study since this would in effect make the findings generalisable to the whole of Scotland and minimise the sampling effects of the data. This was important since the aim of the study was to examine the relationship between the trends in homicide and violence in Scotland overall, and not just parts of Scotland. It was important that the data used reflected the whole of the country and not just the parts which included most respondents. There are furthermore no previously published examples of the use of weighted data in the context of nonparametric multilevel LCA modelling, and this therefore constitutes part of the original contribution of this thesis⁴⁸.

⁴⁸ There has been some use of non-parametric multilevel LCA modelling on unweighted survey data (see Morselli & Passini, 2012), and the use of parametric multilevel LCA modelling on weighted survey data (see Tobler, Komro & Maldonado-Medina, 2009) but no study using non-parametric multilevel LCA modelling on weighted survey data.

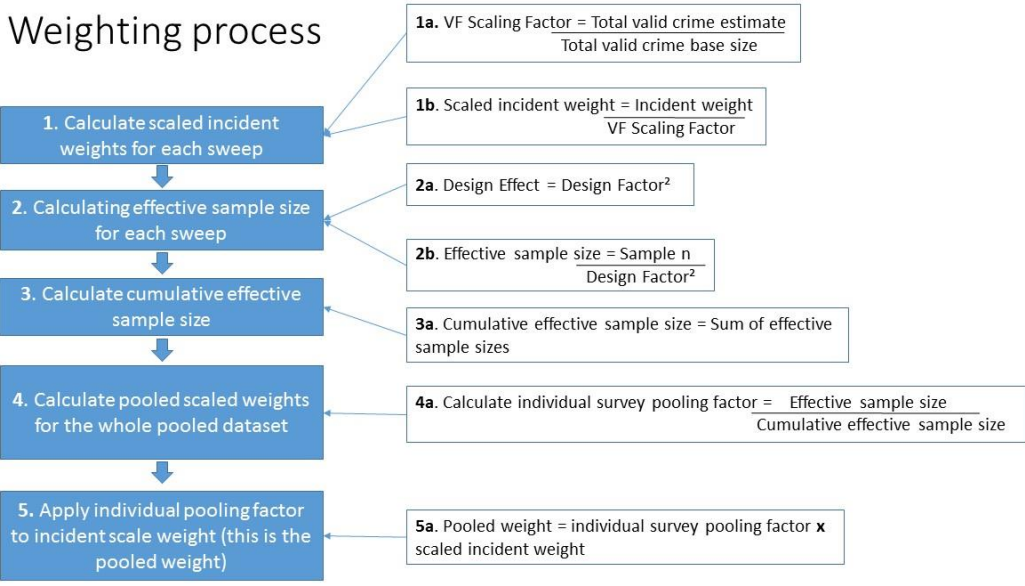
The weights were calculated by the Scottish Government statisticians in several steps. Firstly, scaled weights were calculated for each sweep. The scaled weights ensure that the data is proportionate to Scotland overall and are based on population estimates. The scaled weights were calculated by dividing the incidents weights⁴⁹ by a Victim Form Scaling Factor (see Figure 4.1, box 1b). The Victim Form Scaling Factor was in turn calculated by dividing the total valid crime estimate by the total valid crime base size (see figure 4.1, box 1a.). Next, the effective sample size for each sweep was calculated (see figure 4.1, box 2a-b), before the effective sample size for each sweep was added together into a combined measure of effective sample size (see figure 1, box 3a). This cumulative effective sample size was subsequently used to calculate the individual survey pooling factor by dividing effective sample size for each sweep with the cumulative effective sample size (see figure 4.1, box 4a). Finally, the individual survey pooling factors were then applied to the incident scaled weights in order to create the pooled weight (see figure 4.1, box 5a).

As can be seen, the weight is based on the design factors of the survey sweeps as well as on the population estimates of Scotland. The design factors are calculated to make sure that the impact of each survey is appropriate in relation to the other surveys in the data regarding for instance sample size and sampling method. The weight is also based on the population estimates, to make sure that the data is proportionate to Scotland overall. The weight is however not grossed, which means that although the proportions are accurate in relation to Scotland overall, the numbers are not⁵⁰. The weighting procedure is consistent with previous years of the SCJS, which has previously been undertaken by the Scottish Government working with the Methodology Advisory Service at the Office for National Statistics (Scottish Government, 2016f). The percentages presented from the violence dataset throughout the thesis will unexceptionally be on the weighted data and may therefore not always match with *n*, which are reported incidents, unweighted.

⁴⁹ Incidents weights are based on the individual weights and an expansion factor reflecting whether incidents in the victim form reflect a single or a series incident. The incident weights are applied to all data from the victim forms of the survey, which includes this dataset (see SCJS technical report for more information on how these weights are calculated; Scottish Government, 2016f).

⁵⁰ For more information about the weighting procedure see the technical report of the SCJS (Scottish Government, 2016f)

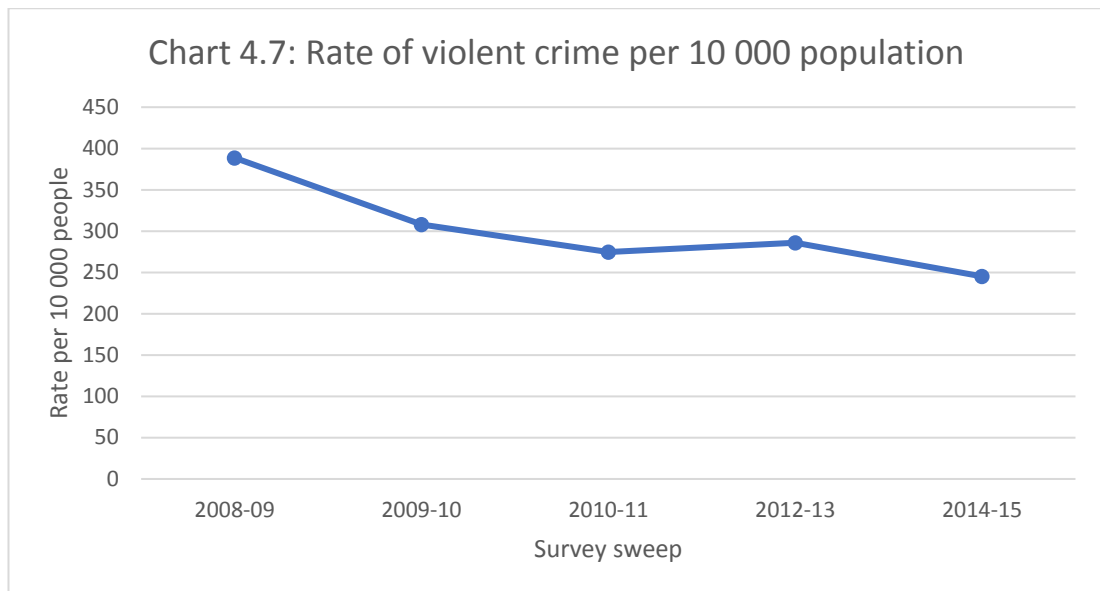
Figure 4.2: Process for creating the pooled weight



Since the structure of the violence dataset has been outlined, the following section will expand on this and move on to the descriptive features of the variables of the violence dataset.

4.4.3 Descriptive features of the violence dataset

In total there were 2097 violent crimes reported in the survey between 2008-09 and 2014-15. When the rate of violent crime as reported by the survey was examined over time (see chart 4.7) it was found that the rate of violent crime has decreased over time. These only included the valid crimes as defined by SCJS, meaning that they only occurred during the determined time periods for each sweep, within the borders of Scotland and fulfilled the criteria for constituting a crime (Scottish Government, 2016e). It is however important to note that the number of respondents (people being interviewed) has decreased with each sweep which means that the error around the rates may have increased. Since violence is a rare event, this means that it might be difficult to find victims of violence in sweeps with fewer respondents overall, suggesting that the decrease in the rate of violence seen here might be related to the decreased sample size.



Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: The crime rate was calculated by dividing the number of violent crimes reported by the number of respondent in each sweep, then multiplied by 10 000.

Note 3: The number of interviews per survey sweep were as follows: 2008-09 (16 000); 2009-10 (16 000); 2010-11 (13 000); 2012-13 (12 000); and 2014-15 (11 500).

Note 4: The number of violent crimes per survey sweep were as follows: 2008-09 (622); 2009-10 (493); 2010-11 (357); 2012-13 (343); and 2014-15 (282).

Table 4.10: Breakdown of violent incidents

Violent crime	Percent
Minor assault with no or negligible injury ⁵¹	43.7%
Minor assault with injury	29.8%
Attempted assault	13.6%
Serious assault	7.1%
Attempted robbery	3.5%
Robbery	2.2%
Serious assault and housebreaking	0.1%

Note 1: Source: SCJS pooled dataset. Base: n=2097

⁵¹ This variable differed in earlier sweeps and had to be recoded to match the least common denominator of all sweeps.

When the violent crimes were broken down to specific offences (see table 4.10) it can be seen that the most common violent crime was assault with no or negligible injury. Little more than two fifths of all violent crime reported in the survey were assaults of this type. Minor assault with injury was the second most common violent offence, with approximately a third of the cases being this type of assault. Only about 8% of all the cases were serious assaults.

The following section will describe the classifying variables and covariates used for the multilevel LCA modelling of the violence dataset in order to identify a typology of violence.

4.4.3.1 Classifying variables for two-level LCA model of violence

In total, 54 classifying variables were included in the model (see table 4.11). All but two of the classifying variables (victim age and offender age) were binary variables. These classifying variables were related to the victim, offender and the incident of violence and as mentioned, they were chosen in order to make the violence model as similar as possible to the homicide model. This meant that where possible, the same variables were included on each level (victim, offender and incident) as in the homicide dataset. There were however some differences between the homicide dataset and the violence dataset which led to discrepancies in the modelling. Certain variables that proved relevant in the homicide dataset (such as offender employment status) did not exist in the violence dataset and could therefore not be included. Other variables, such as victim residential status, existed in the violence dataset but were slightly different. Since the SCJS is a household survey there were no homeless respondents in the violence dataset like there was in the homicide dataset. Instead, the victim residential status variable measured victims living in social housing in the violence dataset since this arguably measured a similar vulnerability to homelessness.

Other variables, such as relationship or motive, measured the same construct across the two datasets, but the categories were different. As far as possible, the violence variables were recoded to match the homicide variables but in some instances the restrictions of the data made this impossible. The victims in the violence dataset were

for instance never asked whether the violent act was motivated by a feud or faction rivalry, making this motivation impossible to code separately in the violence dataset. The motives in the violence dataset were furthermore different from the homicide dataset since they were estimated by the victims and not reported by the police. This means that the motives were not very comparable across the two datasets. Conversely, some variables were important to include in order to understand the violence subtypes but were not included in the homicide dataset. Examples of such variables were whether or not the violent act was a repeat incident or what time of day the crime took place. As mentioned, the variable measuring what time of day the homicide took place had too much missingness and error and was excluded from the homicide dataset, and there was no variable measuring repeat incidents for homicides. Whether or not the violent crime was part of a pattern of repeated victimisation was however of substantive interest for the violence subtypes, and was therefore included in the violence model. Similarly, since the variable measuring what time of day the violent act took place did not include much missingness in the violence dataset, this was also included.

There are consequently discrepancies between the two datasets but the main goal when modelling the violence data was to model it as similarly as possible to the homicide model. As with the homicide dataset, the variables chosen as classifying variables in the violence model were also variables that had been identified as important in typology research of violence (see for instance Bijleveld & Smit, 2006; Holtzworth-Munroe, 2000; Pizarro, 2008; Pridemore & Eckhardt, 2008; Wood Harper & Voigt, 2007). Also in line with the homicide dataset, it was decided to combine the variables measuring whether the victim was under the influence of alcohol and the variable measuring whether the victim was under the influence of drugs into one single measure of 'victim being under the influence'. This was also done for the offenders (see section 4.3.4).

Table 4.11: Classifying variables of the violence dataset

Variables	Missing (%)
Victim variables:	
Victim gender (male/female)	0.0%
Victim age (3 categories ⁵²)	0.0%
Victim employment status (Unemployed/not unemployed)	14.3%
Victim ethnicity (white/not white)	0.0%
Victim residential status (social housing/not social housing)	0.9%
Offender variables:	
Offender gender (male/victim/both)	18.2%
Offender age (4 categories ⁵³)	18.6%
Offender influence of drugs or alcohol (Under the influence/sober)	9.7%
Offender ethnicity (white/not white)	18.4%
Incident variables:	
Motive (7 variables)	3.4%
Relationship between victim and offender (9 variables)	18.2%
Weapon (6 variables)	3.9%
Violence used (6 variables)	16.3%
Injuries sustained (5 variables)	14.4%
Location (6 variables)	2.6%
Whether the crime was a repeat offence (1 variable)	0.0%
Time of day (1 variable)	1.5%
Victim influence of drugs or alcohol (1 variable) ⁵⁴	15.9%

⁵² Victim age was divided into three age groups: 16-24 years old; 25-39 years old and 40 or older. This was done to correspond with the offender age groups. No victims were under the age of 16 since only individuals aged 16 and older participate in the survey (Scottish Government, 2016f).

⁵³ Offender age was divided into four categories: Under 16 years old (school age); 16-24 years old; 25-39 years old; and 40 years or older.

⁵⁴ Since the victims were asked whether they were under the influence in relation to each violent incident, this variable is an incident-level variable and not a victim-level variable.

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: For definition of each variable see section 8.2 chapter 8.

The classifying variables were recoded into binary variables (with the exception of offender age and victim age) for two main reasons. Firstly, this simplified the model since fewer categories needed to be taken into account, and secondly, this allowed for multiple responses. In certain cases, multiple responses were possible since there was more than one offender in a particular case, or simply because the survey allowed for multiple responses. The location variables did for instance consist of a series of survey questions where one question was dependent on the answer of the previous question. The location variables therefore had to be coded in such a way that this order of questioning was not violated. In order to take this into account when modelling the data, the variables were therefore recoded into binary variables, similarly to the variables in the homicide data.

The dataset was also subjected to disclosure control to ensure that no one could be identified within the data. This meant recoding certain uncommon variables such as ethnicity (divided into white and non-white) and age. Due to errors in the code for influence status of the victim in 2010-11 this variable is coded as missing for that particular year. For more information about the classifying variables, including a descriptive analysis, see Chapter 8.

4.5 Chapter conclusions

This chapter has described and argued for the research design of the thesis. It was argued that two separate datasets (the SHD and the SCJS) should be used to fulfil the aim of the study since these two datasets provided the best and most reliable sources available. The details of the two datasets were discussed, beginning with the homicide dataset which was separated into three different datasets (of the victim, offender and incident-level variables) in order to get a better understanding of the data. A fourth dataset was subsequently created, based on the offender with summarised information about the victims at the incident level, since this was argued to be the best solution for conducting the two-level LCA modelling.

The missingness in the homicide dataset was analysed and due to the high levels of missingness in the earlier years of the data, the first ten years of the homicide dataset were excluded from the offender-based two-level dataset. This meant that the final two-level homicide typology was modelled on data from 2000 to 2015 rather than on the full 1990-2015 dataset. Despite the loss of information, it was argued that this solution provided the best fit of the data.

The violence dataset used was a pooled dataset consisting of five SCJS sweeps (2008-09; 2009-10; 2010-11; 2012-13 and 2014-15) constructed by the Scottish Government. Although earlier sweeps were initially added to the pooled dataset, it was decided to only use the pooled dataset because of differences in survey methodology and coding of the variables. It was argued that despite these limitations, the two datasets used in the current study represented the best data available to answer the research questions. The SHD constitutes a population dataset of all homicides perpetrated in Scotland over the relevant time period and, as argued, the SCJS constitutes a more accurate and reliable measure of violence than police recorded crime. The classifying variables for the multilevel LCA model were described in this chapter for both homicide and violence. The following chapter will outline the statistical techniques necessary for conducting such analysis.

Chapter 5: Statistical Methods

5.1 Introduction

As the previous two Chapters have outlined, a specific statistical technique that can identify subtypes in both datasets is necessary in order to fulfil the aim of the study. The previous chapter defined the two datasets used in this research, and this chapter will provide a description of the statistical methods chosen to analyse this data. It will be argued that subtypes of homicide and violence should be considered latent constructs since they are taken to be ‘heuristic devices’ rather than representative of real groups of cases in the population. Because of this, and because of the robustness of the technique itself, it will be argued that Latent Class Analysis (LCA) is the best available clustering technique to identify subtypes of homicide and violence in the data. It will furthermore be argued that a multilevel LCA model, taking the hierarchical structure of both datasets into account, would provide the most appropriate description of the data. No criminological study examining subtypes of homicide and violence has utilised this type of method to date, and the use of this technique therefore constitutes part of the original contribution of this thesis. The chapter ends by providing the exact modelling details of both the homicide and violence models.

The first section of the chapter will begin by outlining why LCA was chosen as a technique for this study.

5.2 LCA as choice of clustering technique

As mentioned in Chapter 3, the aim of the current study is to examine the changing characteristics and patterns of homicide in Scotland and to determine the extent to which changes in homicide reflect the changing characteristics and patterns in wider violence. Furthermore, as argued in Chapter 3, both homicide and violence should be considered heterogenous constructs which, in order to be better understood, should be divided into subtypes since the heterogeneity becomes lost in a single measure. This means that subtypes of both homicide and violence had to be identified in order to fulfil the aim of the study. These subtypes furthermore needed to be examined over

time. In order to identify subtypes based on victim, offender and incident-level variables in both the homicide and violence data, some sort of clustering technique was necessary. As mentioned in Chapter 3, various methods have been employed to identify such subtypes in previous research. A few studies, such as the research by Morton et al., (1998) and Wood Harper and Voigt (2007), identified subtypes by a qualitative examination of groupings of different variables on a case-by-case basis. This method is however very subjective and potentially not very replicable. The types identified were very much at the discretion of the researchers and are therefore difficult to repeat on a larger scale.

Other studies discussed in Chapter 3 identified subtypes of homicide by defining the types based on one single variable before using regression analysis to compare these types on other variables. For instance, Pizarro (2008) divided homicides into different subtypes based on the motive of the offender and Pridemore and Eckhardt (2007) used the influence status of both the victim and the offender to identify subtypes of homicide. Although this is a common method used to identify subtypes of homicide and violence in typology research (see Chapter 3) it is less inductive compared to other methods available. If a deeper understanding of homicide and violence is to be obtained, an explorative method to identify subtypes in the data is arguably preferable. As argued in the previous chapter, the overall research strategy of the current thesis was an inductive, explorative one, and this was important to allow for the identification of new or previously unknown subtypes. Studies such as the ones by Pizarro (2008) and Pridemore and Eckhardt (2007) identify subtypes *a priori* based on previous theory, meaning that it is an essentially deductive approach to typology research which only identifies subtypes which are already known to the researchers. This means that important subtypes might exist in the data but go unidentified, leading to biased results. Furthermore, the *a priori* approach does not allow the examination of different combinations of important variables to subtypes of violence and homicide. As the literature review in Chapter 3 describes, both motive and the influence of alcohol are important variables when disaggregating homicide, but if the subtypes are identified using these variables separately, the effect of the empirical combination of these variables, or the combination of any other variables for that matter, remains unknown.

More sophisticated approaches in typology research have utilised different forms of distance-based clustering techniques to identify subtypes of homicide, such as multiple correspondence analysis (Bijleveld & Smit, 2006), smallest space analysis (Salfati, 2000; Salfati & Canter, 1999) or two-step cluster analysis (Liem & Reichelmann, 2014). These statistical techniques all have the common purpose of identifying subsets in the data that are as similar as possible within the groups, but as different as possible between groups (Rokach & Maimon, 2010). The use of a statistical technique such as cluster analysis also has the advantage of allowing multiple variables to identify subtypes in the data. However, there are some problems with these distance-based clustering techniques. Although useful, these methods are designed to identify similarities between cases based on their proximity using measures of distance, such as for instance Euclidian distance (Romesburg, 1984; Ketchen & Shook, 1998). Distance-based measures are however quite sensitive to the scale of the variables. Although the variables could be standardised (converted into z-scores), this reduces variability and the distance between clusters, risking biasing the results (Cornish, 2007; Ketchen & Shook, 1998; Romesburg, 1984). Since the current study uses categorical data, these distance-based measures, which are mostly concerned with continuous data, are furthermore less suitable. Distance based techniques classify cases into groups purely based on their proximity, without making any assumptions about the underlying distribution of the data or any underlying relationships between the variables.

As described in the previous chapters, both datasets used in the current study are quite complex; both the homicide dataset and the violence dataset are hierarchical in nature, the homicide dataset has issues relating to missingness and the violence dataset is based on survey data and is therefore weighted. As mentioned, both homicide and violence need to be considered heterogenous constructs and disaggregated into subtypes in order to be fully understood. Another way of looking at this is to assume that the subtypes of homicide and violence are latent constructs which explains the heterogeneity in the data. A latent variable can be described as a construct which cannot be observed directly, but which measures an underlying concept and which

usually affects observed variables. Latent constructs can furthermore be used to simplify or reduce data and identify underlying patterns. In this study, subtypes of both homicide and violence are taken to be latent constructs since these subtypes are assumed to be ‘heuristic devices’ (Sampson & Laub, 2005; Skardhamar, 2009), and not representative of distinctive groups of people or cases in the population. There has been a debate in previous research regarding the problematic theoretical implications of classifying individuals into specific types or groups, specifically when these types imply causal differences (see for instance Nagin & Tremblay, 2005; Sampson & Laub, 2005; Skardhamar, 2009). For this reason, it is important to clarify that the types of homicide and violence identified in the current thesis represent one description of a number of potential descriptions possible when complex modelling is utilised on imperfect data. No causal inferences are drawn about the types in this study. Rather, these types are identified in the current study to provide a deeper understanding of homicide and violence overall by summarising complex data, as well as to understand the relationship between the trends in homicide and violence over time in Scotland. As such, subtypes of homicide and violence are considered latent constructs in the data which can be measured through other observed variables. The technique required to identify subtypes in the current study must therefore not only be robust enough to handle all practical issues with the data, but should also be able to model the underlying latent structures in the data.

Although some of these needs can be met by distance-based cluster analysis, such as the extension of this technique to a multilevel framework (see Serban & Jiang, 2012), cluster analysis still only identifies subtypes based on their proximity (or similarity). Distance-based techniques such as cluster analysis therefore do not model the structure behind the data. Other clustering techniques which are model based, like Latent Class Analysis (LCA), however, do. LCA utilises a probabilistic model that describes the distribution of the data and assumes that the types to be identified are related to a latent variable (McCutcheon, 2002). LCA posits that there are one or more subgroups in the population of interest, and that any heterogeneity in the population could be explained by the identification of these subgroups (Lanza, Tan & Bray, 2013). If only one subgroup, covering the entire data, is found to be best solution, it is assumed that the

identification of subtypes does not help explaining the heterogeneity in the population. As mentioned, this technique would take the proposed data structure in the current study into account; the subtypes of homicide or violence would be considered latent variables that are related to the difference between cases of homicide or violence. What this means is that whereas distance-based clustering techniques simply identify clusters based on their similarity, model-based techniques like LCA identify clusters based on their probability of belonging to the latent constructs. The model-based probabilistic nature of the technique also makes it possible to determine goodness of fit of the model, which is not possible with other forms of cluster analyses. Because of this, LCA is often considered a more powerful clustering technique, especially regarding categorical data (Magidson & Vermunt, 2004). LCA also has the advantage of including fewer pre-decisions compared to distance-based cluster analyses, such as choice of similarity measure or aggregation algorithm (Mutz, Bornmann & Daniel, 2013). This is advantageous since more pre-decisions about the analysis increases the risk of the results becoming subjective or arbitrary.

Factor analysis is another model-based technique for identifying latent groups in the data (Tabachnik & Fidell, 2013). However, while LCA aims to identify latent subgroups of cases which have similar response patterns on the classifying variables, Factor Analysis aims to identify latent groups (or ‘factors’) of variables which measure similar constructs (Tabachnik & Fidell, 2013). Both methods are different types of data reduction techniques identifying latent constructs in the data, but while LCA is concerned with the structure of cases, Factor Analysis is concerned with the structure of variables. Since the aim of the current thesis was concerned with types of cases of homicide and violence rather than types of variables relating to violence and homicide, LCA was a more suitable technique.

Not only can LCA handle the issues of the dataset mentioned above (such as missingness and hierarchical structures), but the technique is replicable and takes the underlying data structures into account. Model-based multilevel modelling using an EM-algorithm⁵⁵ has been found superior to distance-based multilevel modelling on

⁵⁵ See section 5.2.1 for information about the EM-algorithm.

almost all accounts, including clustering accuracy on both levels (Serban & Jiang, 2012). Although more computationally heavy compared to distance-based approaches, LCA was considered the best suited clustering technique for the current study and it was therefore decided to use LCA as a statistical method to identify subtypes in the data. The following sections will describe LCA in more detail, beginning with how the model was estimated.

5.2.1 Model estimation

There are two main alternatives to estimate the parameters of LCA; the expectation-maximisation (EM) and the Newton-Raphson algorithms (McCutcheon, 2002). Both of these algorithms are iterative and based on maximum-likelihood estimation. Both algorithms begin with a set of start values before proceeding with a series of steps of parameter estimation and re-estimation iterations, until reaching a pre-set criterion for the iterations to stop. This criterion is usually related to model convergence. Out of the two algorithms, the EM is the one most widely used and is the algorithm that will be used in the current study (Muthén and Muthén, 1998-2012). This is mainly related to the robustness of the start values and the relative ease to programme.

The EM algorithm maximises the likelihood estimation in two steps; firstly, the expected value of the log of the likelihood function is computed based on the start values in the observed data. This is called the expectation (E) step. Secondly, the function is maximised in order to improve the initial parameter estimates. This is called the maximisation (M) step. The new, improved estimates of the parameters then replace the initial estimates and the two steps are repeated until either the parameter estimates, the changes in the likelihood function or the log of the likelihood function reaches the pre-set criteria. In order to make sure that the best log-likelihood function estimated is the global maximum of the likelihood function and not a local maximum (which is a problem with likelihood approaches such as EM), the procedure should be repeated using different starting values (McCutcheon, 2002). If the same loglikelihood value is obtained from multiple sets of start values, this increases confidence that the obtained solution is not a local maximum. Multiple random starts were therefore used in all of the models presented in this thesis. Put in other words, what the EM estimation

really does is to iterate these steps designed to estimate the parameters of the model until the model parameters most likely to account for the observed results are identified.

The LCA model estimates two different forms of parameters when the models are run; individual probability and class probability. Individual probability is an estimate of every individual's probability of appearing in each class. This estimate provides a description of what class (in this case, homicide or violence subtype) each individual case, offender or victim is most likely to belong to and how well the characteristics of this case match the rest of the class. The class probability is an estimate for each class's average score on each of the observed classifying variables. This provides a description of the general characteristics of each class. These two sets of probabilities are used to guide the description as well as the interpretation of the classes identified in the models.

The LCA modelling in the current study was conducted in the software program MPlus version 7.4 (Muthén and Muthén, 1998-2012). In MPlus, the LCA is treated as a multivariate regression model that describes the relationship between the observed dependent models (the classifying variables) and the categorical latent classes. The underlying calculations of this model are still based on the probabilities of the individual (in this case offender, victim or incident) belonging to a certain latent class. This means that although an offender of homicide might be more likely to belong to a certain homicide subtype than another subtype, the offender might still be somewhat likely to belong to all of the other subtypes. Some studies use the most likely class (which is the class with the highest individual probability) when sorting their cases or individuals, but by using the probabilities instead, this effectively takes the measurement error into account.

When conducting LCA modelling, the researcher runs the models with different number of classes before deciding on the best fitting model for the data. The models are compared and evaluated based on various measures of fit in order to determine

which model is most appropriate for the data. The following section will describe the process of model evaluation.

5.2.2 Model evaluation

Deciding on the number of classes deemed most appropriate for the data is arguably one of the most important steps of conducting LCA modelling, and the methods of doing so have been long debated within the literature. There are several different statistical criteria available when evaluating the model that have become standard (McCutcheon, 2002). All these criteria are based on how well the expected cell counts correspond to the original observed cell counts under the model hypothesis and are referred to as IC's (Information Criteria). The decision on the number of classes is therefore generally guided by the examination of these information criteria as well as substantive interpretation of the classes.

Three statistical criteria for model fit will be discussed and used in the current study; the Akaike Information Criteria (AIC); the Bayesian Information Criteria (BIC) and the sample size Adjusted Bayesian Information Criteria (ABIC) (McCutcheon, 2002; Nylund, Asparouhov & Muthén, 2007). While the AIC adjusts the log likelihood value based on the free parameters of the model, both the BIC and the ABIC also adjust for sample size. All three IC's also adjust the log likelihood value to penalise solutions with a high number of classes in samples with large sample sizes (Akaike, 1987; McCutcheon, 2002; Nylund et al., 2007; Sclove, 1987; Schwartz, 1978). There are a few other types of IC's used in the literature but these three (AIC, BIC and ABIC) are used most frequently. Information criteria penalises complex models in favour of more parsimonious models, which encourages the researcher to find the most parsimonious model with the best fit. Better fit is indicated by a lower value of the information criteria (McCutcheon, 2002).

There is however little consensus among researchers regarding which of these information criteria provides the best fit statistic (Nylund et al., 2007). The BIC has been suggested as a superior indicator for deciding on the number of classes since this consistently has been found to outperform other IC's for single-level models

(Hagenaars & McCutcheon, 2002; Yu & Park, 2014). BIC has also been found to correctly identify the number of classes most often in simulation studies (Nylund et al., 2007). Other simulation studies of LCA have however found the ABIC superior in identifying the correct number of classes, stating that the BIC can sometimes underestimate the number of classes (Yang, 2006). The AIC on the other hand has been found to overestimate the correct number of classes (Celeux & Soromenho, 1996) as well as being somewhat unpredictable for LCA models (Nylund et al., 2007; Yang, 2006). The ABIC has furthermore been found to be the most accurate IC when deciding on the number of classes for categorical models but has also been found to overestimate the correct number of classes (Morgan, 2015; Nylund et al., 2007).

Out of these three IC's, the BIC has been found to be the IC which most consistently picked the correct model solution (Hagenaars & McCutcheon, 2002; Nylund et al., 2007; Jedidi, Jagpal & DeSarbo, 1997; Yu & Park, 2014). It is however common that all three of these IC's are examined in combination with a substantive interpretation of the models in order to identify the model which fits the data most appropriately.

Additionally, in line with Matthews, (2017) and Norris (2009), the absolute difference between the IC of the model with the lowest IC and the other models can be examined to guide the decision on the number of classes. If the model with the lowest IC has more classes than another model with higher IC, but the difference in IC between these two models is small, the model with fewer classes could be considered to explain the majority of the heterogeneity in the data (Matthews, 2017:118; Norris, 2009:111; Rindskopf, 2006:447). In that case, it might be preferable to choose the more parsimonious model with fewer classes over a model with more classes and better IC. This will be examined in the current study by the examination of the percentage change in BIC⁵⁶.

Besides IC's, various forms of likelihood ratio tests have been developed in order to assess model fit of latent class models, however, the commonly used loglikelihood

⁵⁶ BIC was the IC chosen since this is the IC statistic that has shown to most consistently pick the correct model solution (Hagenaars & McCutcheon, 2002; Nylund et al., 2007; Jedidi, et al., 1997; Yu & Park, 2014).

ratio test cannot be used to test nested latent class models (Nylund et al., 2007). Two alternative tests were developed in order to compare nested latent class models; the Lo-Mendell-Rubin Likelihood Ratio Test (LMR) (Lo, Mendell & Rubin, 2001) and the Bootstrap Likelihood Ratio Test (BLRT) (McLachlan & Peel, 2000). Both these tests examine two nested models regarding the significant difference between the loglikelihood ratio for a model with k and $k-1$ classes. This effectively provides a significance test between the current model and the previous one. However, neither the LMR nor the BLRT is possible when weighted data is used (Muthén, 2007a; Muthén, 2016). These fit statistics could therefore not be used in the violence model, and in order to keep the evaluation of the models consistent, it was decided not to use these fit statistics for the homicide model either. Since the violence model was constructed to be as similar as possible to the homicide model (see Chapter 4), it was not considered meaningful to use different fit statistics for the two models. It was therefore decided to only examine the IC's as statistical criteria to determine goodness of fit in the current study. The IC's (AIC, BIC and ABIC) will be examined alongside the entropy value (see below) and the substantive interpretation of the models.

In addition to the three statistical measures of fit, Mplus provides an entropy value for each LCA model produced. The entropy statistic is a measure of certainty of class membership, and the closer the entropy value is to one, the more distinct and clearly defined are the classes (McCutcheon, 2002; Vermunt & Magidson, 2002). If the entropy value equals one it would mean that all cases were perfectly classified into the different latent classes with zero error (Clark & Muthén, 2009). Although entropy is not a pure fit statistic, it does provide a measure of how clearly defined the classes are (McCutcheon, 2002) and can therefore be considered relevant when deciding on the number of classes. A model with high entropy but slightly worse fit statistics would most likely be preferred to a model with excellent fit statistics but low entropy. This is because a model with low entropy is likely to have less distinct classes, which makes for a substantively less meaningful model.

The substantive interpretation of the models is another criterion used when deciding on the number of classes besides the statistical criteria (see for instance Tobler et al.,

2009). The purpose of conducting LCA modelling is to identify patterns in the data which are not based on arbitrary cut-off points (Nagin, 2004) and which are meaningful for the purpose of the research. A model could have superior statistical measures of fit but if it lacks substantive relevance, the model automatically loses its value. Since the modelling in the current thesis is used as a tool to answer the research questions and to identify meaningful subtypes of homicide and violence, the substantive interpretation is therefore of great importance when deciding on the number of classes.

The substantive interpretation of the classes in the various models in the current study is conducted by plotting out the class probabilities across the different classifying variables (see Norris, 2009). This allows for an examination of the characteristics of each class in the different models, and facilitates the comparisons between models. For instance, although the fit statistics mentioned above might indicate that a four-class solution is a better model than a three-class solution, the additional class of the four-class solution might not add any substantive value for the model as a whole. The additional class created might for instance be splitting one class into two very similar classes. This would be less meaningful than if the additional class was split into two very different classes or if an additional class was created from various different classes (Norris, 2009). The pattern of the additional class would however not become apparent until the classes are examined substantively across the various classifying variables used in the model. In such a case, it might be preferable to choose the three-class model although the four-class model has superior fit statistics, since the additional class provides little additional explanatory value.

Although this provides the researcher with some amount of freedom when choosing the model, LCA is still less subjective compared to previously mentioned methods (such as the *a priori* method or cluster analysis) for three main reasons. Firstly, although the substantive interpretation of the models is important, the choice of the best fitting model is still guided by the fit statistics in the first instance. This is different from both cluster analysis and the *a priori* method which do not tend to use fit statistics. Secondly, while both the distance measure and aggregation algorithm are determined

by the researcher when conducting cluster analysis, only the number of classes is determined by the researcher when conducting LCA. Since the choice of distance measure can greatly change the classes identified (Romesburg, 1984; Ketchen & Shook, 1998), this suggests a higher subjectivity when using cluster analysis compared to LCA. Thirdly, the *a priori* method only finds the types which the researcher is looking for, without any possibility of finding any new types in the data. This all suggest that both cluster analysis and the *a priori* method are more subjective techniques than LCA.

Overall, five different statistical measures of fit will be examined besides the substantive interpretation of the models in order to decide on the number of classes for the LCA models: AIC; BIC; Percentage change in BIC; ABIC and entropy. The following section will describe how missingness, which is a problem with the homicide data, is handled within the context of LCA modelling after the first ten years (1990-1999) of the data was removed.

5.2.3 LCA and Missingness

As argued in Chapter 4, the missingness in the current study could be described as Missing at Random (MAR). When running LCA models in MPlus the missing data is handled using the Full Information Maximum Likelihood method (FIML) (Graham, 2009). The FIML (which is a form of EM algorithm) works very similarly to the model estimation of the substantive model and assumes that the data is MAR (Missing at random) or MCAR (Missing completely at random) (Graham, 2009; Tabachnick & Fidell, 2013:68). Firstly, the Estimation step finds the conditional expectations of the missing data, given the observed values and parameter estimations. Secondly, the Maximisation step performs the FIML estimation as though the missing data from the Estimation step had been filled in. This is subsequently repeated until convergence is achieved (Tabachnick & Fidell, 2013). Since the FIML method uses the raw data as input in the Estimation step, all the available information in the data can be used.

The FIML method has similar statistical properties to Multiple Imputation (MI), but differs in certain aspects (Allison, 2012). Whereas MI methods involve two models

(an imputation model and an analysis model) everything is done under one model in the FIML method. Only using one single model is advantageous since conflict between the imputation model and analysis model sometimes can arise (Allison, 2012). The FIML method does not replace or impute any values but instead handles the missing data within the analysis model. The next section will describe the extension of LCA to a multilevel framework in more detail.

5.2.4 Multilevel LCA

Although single-level LCA usually assumes independence between the cases, many empirical datasets do not follow such a clear structure (Henry & Muthén, 2010; Tabachnick & Fidell, 2013). Observations are often nested within groups in the data structure, violating the assumption of independence. In the current study for instance, both offenders and victims of homicide are nested within homicide cases. In order to not misinterpret the data, such nested datasets require multilevel modelling techniques. Similarly, the violence data is also hierarchical in nature since any victim can report more than one violent crime. If hierarchical data is analysed as if it were on the same level, this can lead to statistical and interpretational error.

When discussing multilevel models, the lowest level is often described as the ‘within’ level whereas the second level with fewer cases is often referred to as the ‘between’ level. For instance, in a case of homicide offenders nested in homicide cases, the offenders would constitute the within level and the cases would be on the between level. Although the two levels in the current study could have been modelled by introducing the between-level variables as covariates on the within level, essentially conducting a single-level model with many covariates, this was decided against for several reasons. Firstly, due to the data structure of the homicide dataset (see Chapter 4), the between-level consisted of the incident and victim variables, meaning that there would be a very large number of covariates added, complicating the model considerably. Additionally, since many of the incident-level variables in the homicide dataset are of great importance when classifying the cases, this was not a preferred solution. It was of substantive interest to include between-level classifying variables in order to examine between-level latent classes of incidents and victims (homicide

model) and victims (violence model). It was therefore decided to conduct multilevel LCA modelling in the current study.

Multilevel modelling permits the data to be modelled on more than one level, which is why it is an appropriate technique for clustered data such as the current datasets (Tabachnick & Fidell, 2013). This type of technique allows prediction of individual scores adjusted for group differences as well as the prediction of group scores adjusted for individual differences. Multilevel modelling takes care of these issues by permitting the intercepts as well as the slopes of the analysis to vary between different groups or units (Tabachnick & Fidell, 2010; Vermunt, 2003). This means that the relationship between dependent variables and independent variables is permitted to vary between groups.

Multilevel LCA is therefore a type of LCA that take into consideration these hierarchical structures in the data. Multilevel LCA addresses this issue by allowing latent class intercepts to vary across between-level groups, thereby examining if and how these between-level groups influence the latent classes on the within level (Henry & Muthén, 2010). That is, the probability for an offender to belong to a certain class is likely to vary significantly across different homicide cases. In a two-level LCA model, the log-odds of belonging to one certain class rather than another are allowed to vary between groups (or in this case, homicide cases). In that way, the non-independence of observations is modelled and therefore accounted for. Although one of the downsides with multilevel LCA modelling is the difficulty of convergence as well as long computation time (Tabachnick & Fidell, 2013), this type of modelling provided the most appropriate representation of the data in the current study, and was therefore chosen as the best statistical technique⁵⁷.

The following section will briefly describe how multilevel LCA modelling has been used in previous research before the implementation of this technique in the current study will be described.

⁵⁷ For more technical details on how single-level LCA modelling is extended to multilevel LCA, see Vermunt (2003).

5.2.5 Multilevel LCA in previous research

LCA modelling in general, and multilevel LCA modelling in particular, has seen limited use on cross-sectional data in the social sciences. The use of LCA is however becoming increasingly prevalent due to the many advantages of the technique in comparison to more traditional forms of cluster analysis (see section 5.2). LCA modelling has for instance been used to assess different types of alcohol dependence (Grant et al., 2006; Moss, Chen & Yi, 2007), peer victimisation subtypes (Nylund, Bellmore, Nishina & Graham, 2007) and subtypes of gambling (Cunningham-Williams & Hong, 2007). The use of multilevel modelling is also becoming increasingly common in the social sciences (see for instance Henry & Muthén, 2010; Cray, Woods, Herting & Sullivan Mitchell, 2012; Rindskopf, 2006; Tomczyk, Hanewinkel & Isensee, 2015). This increase in popularity is perhaps not so surprising since many of the datasets used in the social sciences are hierarchical in nature and studies have found that ignoring the higher-level nesting structure can lead to poor models and false conclusions (Finch & French, 2014; Park & Yu, 2016).

Most studies that have used multilevel LCA modelling however tend to model the between-level by letting the intercepts of the within-level classes vary on the between level (Henry & Muthén, 2010; Cray et al., 2012; Rindskopf, 2006; Tomczyk et al., 2015). However, the current study will model a second, categorical latent construct on the between level using between-level indicators. This means that while other studies such as by Tomczyk et al., (2015) and Cray et al., (2012) only examine latent classes on the within level that are influenced by between-level effects, the current study examines latent classes on both the within and the between level. This approach was used since by letting the within-level intercepts vary on the between-level, the between-level variables are essentially only controlled for, rather than examined in their own right. Although this might have been feasible with the violence dataset, the homicide dataset has the majority of the variables of interest (victim and incident, see Chapter 4) on the between level. Modelling the two-level structure by allowing the within-level intercepts to vary on the between-level would therefore have meant a huge loss of information. It was therefore decided to model latent classes on both levels, since this approach provided most information about the variables.

A few studies in various disciplines within the social sciences have modelled two levels of latent classes in this way, for instance in psychology (Finch & Merchant, 2013; Lettow, Vermunt, de Vries, Burdorf and Empelen; 2012), behaviours in information science (Hsieh, Yang, Yang & Yang, 2013; Yang & Hsieh, 2011), political science (Morselli & Parsini, 2012), consumer behaviour (Dal Bianco, Paccagnella & Varriale, 2016) and education (Allison, Adlaf, Irving, Schoueri-Mychasiw, & Rehm, 2016; Fagginger Auer, Hickendorff, Van Putten, Beguin & Heiser, 2016; Urick, 2016). Despite its increased popularity however, multilevel LCA has not been used widely in criminology. As mentioned in section 5.2, most typology research on violence and homicide tend to identify subtypes *a priori* on substantive grounds. Other studies have utilised different forms of distance-based clustering techniques to identify subtypes, such as multiple correspondence analysis (Bijleveld & Smit, 2006), smallest space analysis (Salfati, 2000; Salfati & Canter, 1999) or two-step cluster analysis (Liem & Reichelmann, 2014).

To the knowledge of the author, no study has ever used multilevel LCA modelling when identifying subtypes of violence or homicide and the use of this technique therefore constitutes part of the original contribution of this thesis. The next section will continue to describe the applied use of multilevel LCA modelling in the current study.

5.3 Implementation of Multilevel LCA in this study

All the LCA modelling in the current study (including both single-level and multi-level LCA's) were conducting in Mplus version 7.4. As previously mentioned, the purpose of LCA is to identify latent subgroups in the data, if they exist, based on observed characteristics. In terms of this research, this means that the homicide types are estimated based on observed variables measuring characteristics of the victims, offenders and the incident relating to homicide. The same is true for the violence typology. This means that the classes identified will be types of homicide or violence that are different from one another based on these classifying variables. The two sets

of probabilities mentioned above (individual probability and class probability) were used to interpret and describe the classes that were identified.

Multilevel LCA modelling can be conducted with either a parametric or nonparametric approach (Henry & Muthén, 2010; Finch & French, 2014; Vermunt, 2010; Yu & Park, 2014). The parametric approach essentially introduces a continuous random effect on the between-level in the form of a within-level random intercept (Henry & Muthén, 2010; Yu & Park, 2014). The nonparametric approach on the other hand introduces a discrete random effect in the form of a categorical latent construct on the between level. The nonparametric approach therefore assumes discrete latent components on both levels. The nonparametric approach has other advantages to the parametric approach besides allowing for non-normality of the underlying distribution; it is also less computationally heavy and lends itself to easier substantive interpretation (Muthén & Asparouhov, 2008; Fagginger Auer et al., 2016). When the performance of parametric and nonparametric Multilevel LCA models were compared, Finch and French (2014) concluded that both methods work equally well. The nonparametric approach is recommended when, as in the current study, there is an explicit interest in examining a direct interpretation of between-level classes since there are no classes on this level in the parametric approach (Rights & Sterba, 2016). Since the variables used in the current study are binary or categorical, the underlying distribution of the data can be considered non-normal and it was therefore decided to use the nonparametric approach in the current study.

There has been some debate in the literature regarding the best way to evaluate multilevel LCA models (Lukociene, Varriale & Vermunt, 2010). Bijmolt, Pass and Vermunt (2004) evaluated models for all relevant combinations of within and between models in order to find the best fitting model. A three-step method was suggested by Lukociene et al., (2010) which proved to be an equally well-performing procedure to the one by Bijmolt and colleagues. Since both of these procedures have been shown to work equally well, it was decided to follow the more exploratory method of Bijmolt and colleagues (2004) and estimate models for all the relevant combinations of classes.

Since the classes are identified in the data by probabilistic methods, this means that any victim, offender or incident in the current study has a different probability of belonging to each of the various classes identified in the model. A victim could for instance have an 80% probability of belonging to a certain class, but that means that the same victim has a 20% probability of not belonging to this class. This means that there will always be classification error in the model, as with any model that aims to disaggregate data into groups. As mentioned, it is therefore important to note that all the classes and types discussed in the current thesis are meant as ‘heuristic devices’ (Sampson & Laub, 2005; Skardhamar, 2009), aimed to provide a more detailed description of homicide and violence and not as to represent actual or real groups of people or cases in the population.

Arguably the goal of any form of modelling is to provide a condensed, helpful simplification of the data (Bradley & Schaefer, 1998). This is the goal when conducting various types of modelling including latent classes, including the current study. That said, the classes described in the current thesis are sometimes described in deterministic language for the sake of clarity when presenting the results. For instance, a class of homicide victims who are 80% male will be described as ‘the male victim class’. However, this does not mean that all the victims in this class are male, just that there is an 80% probability for the offenders to be male in that particular class. As mentioned, this was decided for sake of clarity of the results, but it does not mean that the classes are considered to be deterministic or static in nature.

It is also important to note that when using a technique such as LCA, classes will be identified in the data regardless of whether these are logical or theoretically appropriate (Norris, 2009). This means that some groups identified in the data might be methodological artefacts (Skardhamar, 2009). It is therefore vital that the classes identified are interpreted within the appropriate theoretical and empirical context in order to become meaningful. The researcher determines the number of random starts for each model and this number can be increased if the loglikelihood of a model is not replicated. When the loglikelihood of a model is not replicated even with many starts however, this indicates that the data do not show signs of the number of classes that is

attempted to be identified (Muthén, 2007b). It was therefore decided that the number of random starts would not be increased by more than 400%⁵⁸ from the first model run for any model in the current study. The next two sections will describe the precise modelling of the homicide model and the violence model, respectively.

5.3.1 Homicide model

The homicide modelling will be described first since this typology was of primary interest of the study (see chapter 1), after which the violence modelling will be described. The two models are very similar but due to the differences in data structure, as described in the previous chapter, the models will be described separately. This section will begin by providing the rationale for conducting single-level models of the homicide data before the two-level model was run, as well as an overview of all the classifying variables used in the LCA analyses.

5.3.1.1 Rationale for conducting single-level models of homicide

As discussed in Chapter 4, the homicide data was hierarchical in structure, meaning that any homicide case could include more than one victim and more than one offender. In order to take this hierarchical structure into account, it was decided to conduct a two-level model. However, before this two-level model was conducted it was decided to model the three different aspects of a homicide case (victim, offender and incident) separately for three main reasons. Firstly, separate single-level modelling of victims, offenders and incidents provided more detailed information about these three aspects of homicide, such as providing an indication of the most appropriate number of classes in each model, before the two-level modelling was conducted. Secondly, the single-level modelling helped guide what classifying variables to include in the two-level model. As can be seen in table 5.1, there was a large number of variables relating to the victim, offender and to the incident of homicide, so the single-level modelling helped make the two-level modelling more parsimonious. If a classifying variable failed to disaggregate between the classes in the single-level model it was excluded from the two-level modelling. The classifying variables were chosen

⁵⁸ This number was decided since it allowed for exploratory examination while at the same time restricting the increase in random starts.

on the basis that previous studies (Bijleveld & Smit, 2006; Pizarro, 2008; Pridemore & Eckhardt, 2008; Wood Harper & Voigt, 2007) had identified these variables as relevant when disaggregating homicide (see chapter 3 for a more detailed discussion). However, the single-level modelling of each level (victim, offender and incident) ensured that the variables chosen for the two-level model were relevant for identifying subtypes of homicide as well as substantively interesting. Thirdly, not only did the single-level modelling help determine what variables to exclude from the two-level model, but it also provided an indication of which variables relating to the victim, offender and the incident respectively that were most important when identifying subtypes of homicide. Modelling the three aspects of homicide separately revealed what variables had most influence over the model, and led to the exclusion of redundant variables. If the two-level model had been run from the beginning, this would not have been known.

Table 5.1: Classifying variables for all three aspects of homicide; victim, offender and incident

Victim variables	Offender variables	Incident variables
Age at time of crime	Age at time of crime	Method of Killing
Gender	Gender	Relationship between offender and victim
Employment status	Employment status	Motive
Ethnicity	Ethnicity	Rural or urban location
Influenced by alcohol or drugs	Influenced by alcohol or drugs	Public or private location
Residential status	Residential status	Inside or outside
	Suicide of the offender	Weapon selection

Note 1: Source: SHD.

It was furthermore decided to run the single-level models on the 26-year dataset spanning from 1990 to 2015, rather than the 16-year dataset, for two main reasons. Firstly, when the single-level models were run on the 16-year dataset (see appendices:

6.3; 6.6; and 6.8) it was revealed that the model solutions were virtually indistinguishable from the single-level models of the 26-year dataset. These similarities would suggest that the missingness prevalent in the 26-year dataset did not substantially affect the single-level models, even if the missingness appeared to have an effect on the two-level models (see Chapter 7, section 7.2). Since the single-level models of homicide were conducted in order to determine what variables to include in the two-level model as well as provide a more detailed description of the three aspects of homicide, it was therefore decided to run the single-level models on the 26-year dataset. Secondly, this provided information about the long-term trends of homicide which were not covered in the two-level models. The single-level models of homicide therefore held important information in their own right.

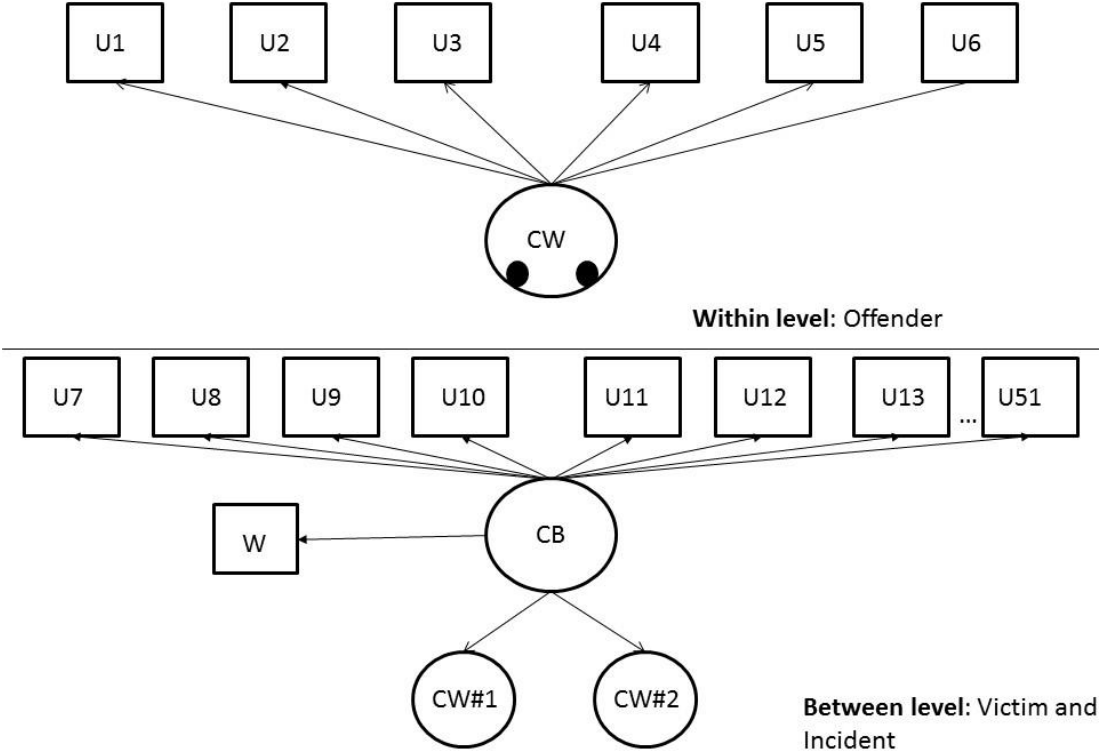
5.3.1.2 Two-level homicide model

After the three single-level LCA models of the homicide data had been run, a two-level model was run on the offender-based two-level dataset⁵⁹. This model was initially run on the 26-year dataset (1990-2015), but as discussed in Chapter 4, because of the high level of missingness in the early years of the dataset, the final model was run on the 16-year dataset (2000-2015). In the 16-year two-level model, two latent constructs were estimated; a within-level multinomial latent variable (classes of offenders) and a between-level multinomial latent variable (classes of cases and summarised victim variables) (see figure 5.1). Separate classifying variables were introduced for the within-level and the between-level respectively, meaning that the model as a whole estimated two different, but related, forms of latent constructs. The within-level latent classes and the between-level latent classes were related by regressing the random intercepts of the within-level classes (expressed as CW#1 and CW#2 in figure 5.1) on the between-level classes (expressed as CB in the model). This essentially meant that the two-level model assumed a multinomial distribution rather than a normal one, since the latent variable on both the within and the between level were multinomial latent variables. This also means that the model can be considered non-parametric and that it assumes non-normality of the random intercepts (see Henry & Muthén, 2010;

⁵⁹ See Chapter 4 (section 4.3.7) for more information on this dataset.

Muthén & Muthén 1998-2012). The homicide model was initially run with 500 random starts.

Figure 5.1 Model of Multilevel LCA of two-level homicide data



Note: Notation borrowed from Muthén and Muthén (1998-2012).

Figure 5.1 above demonstrates the multilevel LCA model used in the current study. Squares represent observed variables, either categorical classifying variables (labelled as U) or categorical covariates (labelled as W). Latent variables are denominated in circles, and labelled CW (n=3) for the within-level (offender) latent classes and CB (n=4) for the between-level (incident and victim) latent classes. The U1 – U6 variables in the squares on the within-level demonstrates the six within-level classifying variables relating to the offender. The two filled in (black) circles in the within-level model represents the random intercepts for the within-level latent classes. There are T-1 number of random intercepts where T is equivalent to the number of within-level classes. These random intercepts are referred to as C#1 - C#2 in the between-level

model. The effects of the random intercepts of the classifying variables on the classes are sometimes modelled on the between level as well, however it is generally considered that the clustering effects from the classifying variables are sufficiently modelled by the within-level random intercepts already modelled on the between-level, and will therefore not be modelled here⁶⁰.

The U7 – U51 variables in the squares demonstrates the observed classifying variables in the between-level part of the model (n=45). These represent the 16 victim variables and 29 incident variables used to classify the between-level latent classes. The dots in the between part of the model, between variables U13 and U51, represent the remaining classifying variables between these numbers (U14-U50), which were not included here for sake of space. In the two-level model, time was also added as a covariate (seen as W on the between level of figure 5.1). This was done so that the change in the identified homicide types could be examined over time. Covariates can be added in two different ways in a LCA model; either the covariates can be added to have a direct effect on the classifying variables before the latent classes are identified, or the covariates can be modelled as a probability of an individual appearing in a particular class (Nylund-Gibson & Masyn, 2016). The latter way of modelling covariates is more empirically common (Nylund-Gibson & Masyn, 2016) and is also the method chosen in the current study (see figure 5.1). This allows for the examination of the effect of time on the different classes, effectively examining how the different types of homicide have changed over time in relation to each other. When a two-level model is run, a decision also has to be made as to what level the covariates should be modelled. In the two-level homicide dataset, the covariates were modelled on the between (case and victim) level (see Figure 5.1). The between level was chosen since this variable effectively varied on this level, since the year of the homicide was determined by the year of the incident. The covariates consisted of four binary variables measuring four-year groups⁶¹, covering the time period 2000-2015. The first year-group (2000-2003) was used as the reference variable. The covariates were

⁶⁰ See Henry and Muthen (2010) for more detail on this as well as possible ways of modelling the random intercepts of the classifying variables.

⁶¹ The year groups were: 2000-2003; 2004-2007; 2008-2011; and 2012-2015.

recoded into binary variables since a multilevel LCA of this type only allows continuous or binary covariates in Mplus (Muthén & Muthén, 1998-2012).

There are also different ways of estimating LCA models when covariates are involved. Either the covariates can be added alongside the other variables simultaneously in the model (also known as the one-step method) or the model can be run using an alternative method called the three-step method (Asparouhov & Muthén, 2014). In the three-step method the model is initially run without the covariates, before the posterior probabilities of the most likely class is regressed on the covariates. The three-step method therefore does not influence the classification of the latent classes. Although this is sometimes considered an advantage, there was a substantive interest of examining the effect of time on the different classes in the current study. Additionally, there does not appear to be a procedure in place for conducting a three-step method for Multilevel LCA modelling (Muthén, 2015). Because of this, it was decided to use the one-step approach when fitting the model and introducing the covariates.

5.3.1.3 Examining change over time of homicide types

In order to examine whether the identified types of homicide had changed over time, two measures were calculated based on the individual probabilities in the model; the average probability for each between class per year-group and an estimated number of offenders per year group. The between classes were chosen since this was the level on which the covariates were introduced (see figure 5.1). The mean probabilities per year group were calculated by saving the individual probabilities for each offender⁶². That means that every offender had a probability score for each of the different possible homicide subtypes (combination of within and between classes) that were identified in the model. The probabilities of each between class were then summed for each individual, leaving each person with a summed probability for each between class. These summed probabilities for the between classes were then averaged per each year group by calculating the mean of this summed probability over each year group. By doing this, it was possible to estimate how likely each between class was in any year group compared to any other year group, and whether there had been a relative change

⁶² This is done by using the SAVE=CPROBABILITIES command in Mplus.

over time. The average probability of belonging to each class per year group was then plotted over time. No confidence intervals around the average probability was calculated for two main reasons; firstly, the software programmes used to calculate these estimates assumed normality in the calculation, which is an assumption that this data violates. Secondly, these calculations failed to take the uncertainty of the latent estimates into account. Since the average probabilities are latent constructs, estimated using the parameters of the latent class model as well as the observed responses, these estimates include a level of uncertainty that is not reflected in the confidence intervals calculated using these software programmes, even when bootstrapping was used. This would mean that any confidence intervals obtained in this way would be narrower than they should be, which in turn would mean that the results would not be as certain as the confidence intervals would suggest (R. Pillinger, personal communication, May 25, 2017). It was therefore decided not to include standard errors or confidence intervals since these would be misleading in any case. Instead, these measures should be interpreted with extra caution.

Mann Whitney U-tests were subsequently conducted to compare the average probability of the classes in any given year group to the average probability of the same class in any other given year group in order to determine if the change in average probability was statistically significant. Mann Whitney U-tests were chosen instead of t-tests due to the assumed non-normality of the data, as well as the low number of data points. Bonferroni correction of the p-values, usually applied to reduce Type I error (Tabachnik & Fidell, 2013), was not implemented since this method has been criticised for reducing statistical power of the analysis as well increasing Type II error to unacceptable levels (Nakagawa, 2004; Perneger, 1998). Instead, effect size was reported using an approximate value of r^{63} (Pallant, 2010).

The estimated number of offenders per year group was calculated by multiplying the average probability of each year group by the total number of offenders in each year. That resulted in an estimate of the number of offenders per homicide type per year group. By doing this, the absolute change in the homicide types could be examined

⁶³ Calculated as: $r = z/\text{square root of } N$ (Pallant, 2010).

over time. Since this was a summary measure (estimating the number of offenders by summing the individual class probabilities of each class per year group), no significance tests were conducted to examine the difference between year groups. Both of these measures were calculated in order to examine the absolute and relative change in homicide types over time. Even though the homicide types might be decreasing in absolute terms, there might be a relative increase in some types, and both these measures were therefore deemed important.

This meant that no logistic regression of the binary covariates measuring time was examined in the models conducted. Since it was of substantive interest to examine how the different homicide types differed over time, the year-groups were still included as covariates in the model, however. Plotting both the average probability of belonging to each class in each year-group as well as the estimate of the number of offenders in each class in each year-group provided an answer to the third research question of how the mix of the homicide types had changed over time. It was therefore not considered meaningful to include results from a logistic regression since the information from such an analysis would not add any information relevant to answering the research questions.

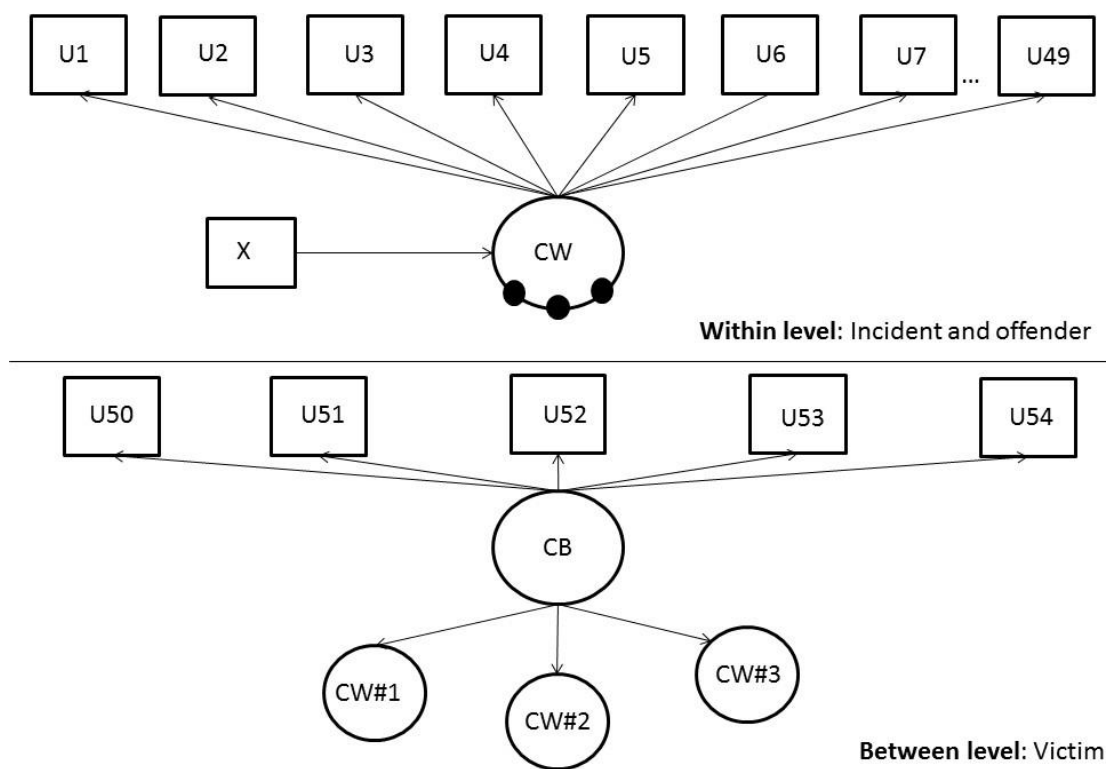
5.3.2 Violence model

After the two-level homicide data had been modelled, the two-level violence dataset was modelled, using time as a covariate on the within (case and offender) level (see Figure 5.2).

Figure 5.2 below illustrates the multilevel LCA model used in the current study. As with the homicide model, the U-variables in squares on both levels demonstrate the observed classifying variables of the victims (between level) and the offenders and the incident itself (within level). The five variables relating to the victim were modelled on the between level since these variables only varied between victims. The offender and incident variables (n=49) however varied between cases, and were therefore modelled on the within level. In total, there were 54 observed classifying variables used, and 4 covariates. The dots in the within part of the model, between variables U7

and U49, represent the remaining classifying variables between these numbers (U8-U48), which were not included here for sake of space. As with the homicide model, the multilevel LCA estimates one latent construct on the within (incident/offender) level (CW) and another latent construct on the between (victim) level (CB). The circle labelled CW in the within part of the model represents the latent classes on the within level, for which there are four in this model. The three filled in (black) circles on the within-model represents the random intercepts for the within-level latent classes. There are $T-1$ number of random intercepts where T is equal to the number of within-level classes. These random intercepts are referred to as C#1, C#2 and C#3 on the between-level. The violence model was initially run with 200 random starts.

Figure 5.2 Model of Multilevel LCA of two-level violence data



Note: Notation borrowed from Muthén and Muthén (1998-2012).

As with the homicide data, the reason for choosing the within level to model the covariates was because the covariates effectively varied on this level. In the figure, the covariates are denoted as a square X, since they are observed variables. Although this

is only represented by one square in the model figure, time was dummy coded into four binary variables, each measuring one survey sweep (2008-09; 2009-10; 2010-11; 2012-13; and 2014-15), before it was introduced into the model. The first survey year (2008-09) was the reference variable.

5.3.2.1 Examining change over time of violence types

The change over time in the violence types was conducted exactly the same way as with the homicide data. Two measures were calculated; the mean probability of the within classes per year and the estimated number of cases per year in order to examine both the relative and absolute change in violence types over time. The within classes were chosen for the violence data since this was the level on which the covariates were introduced (see figure 5.2). The mean probabilities per survey sweep were calculated by saving the individual probabilities for each case⁶⁴. That means that every case had a probability score for each of the different possible violence subtypes (combination of within and between classes) that were identified in the model. The probabilities of each within class were then summed for each case, resulting in a summed probability for each within class. The mean probability for each within class for each survey sweep was then calculated by averaging these summed probabilities for each survey sweep. By doing this, it was possible to estimate how likely each within class was in any survey sweep compared to any other survey sweep, and whether there had been a relative change over time.

Mann Whitney U-tests were subsequently conducted to compare the average probability of the classes in any given year to the average probability of the same class in any other given year in order to determine if the change in average probability was statistically significant. As with the homicide data, Mann Whitney U-tests were chosen instead of t-tests due to the assumed non-normality of the data, as well as the low number of data points. The estimated number of cases per year was calculated by multiplying the average probability of each year by the total number of cases in each year. That resulted in an estimate of the number of cases per violence type per year. By doing this, the absolute change in the violence types could be examined over time.

⁶⁴ This is done by using the SAVE=CPROBABILITIES command in Mplus.

Since this was a summary measure (estimating the number of cases by summing the individual class probabilities of each class per year), no significance tests were conducted to examine the difference between years. Both of these measures were calculated in order to examine the absolute and relative change in violence types over time. Even though the violence types might be decreasing in absolute terms, there might be a relative increase in some types. As with the homicide model, logistic regressions using the binary covariates were deemed unnecessary in light of these results (see section 5.3.1.1). The following section will briefly discuss the nomenclature of the classes identified of both homicide and violence.

5.3.3 Nomenclature of the classes

The names of the classes in the different typologies were decided based on their most distinguishing traits. Since the classes within each model were based on the same classifying variables, some of the classes within each typology were likely to be similar. However, in order for the model to be substantively interesting, there had to be something unique about each class. These unique traits or characteristics guided the decision of the names for the classes. Usually, but not exclusively, this was also the most common characteristic of that particular class. If two classes for instance both were characterised by the use of sharp weapons and offenders and victims that were known to each other, having two classes with almost identical names would confuse the classes rather than differentiate them. In this instance, one of the classes would get named after another, less prominent circumstance, such as the murder taking place in a rural setting, in order to differentiate the classes, even though the rurality of the murders might still just be higher than the average rurality and not high in absolute terms. Since the identification of both a homicide and violence typology was important in order to fulfil the aim of the study, it was important that the names of the classes distinguished these classes as clearly and succinctly as possible. For sake of clarity, three different terms were used in relation to the classes. ‘Type’ referred to the ‘main’ classes, which involved the largest number of variables in each model. For the homicide model, this meant the classes on the between (incident and victim) level, and for the violence model this meant the classes on the within (incident and offender) level. ‘Class’ referred to classes based on the lowest number of variables, which was

the offender classes (within level) of the homicide model, and the victim classes (between level) of the violence model. ‘Subtype’ referred to the latent patterns of the combination of both types and classes, such as for instance the *Employed Offender Rivalry Subtype*.

5.4 Chapter Conclusions

This chapter has described the statistical methods used to identify subtypes of both the homicide and violence data. It was argued that LCA is the most appropriate statistical technique for the current study since it is a very robust technique that allows for the many complexities in this data. Additionally, it was argued that subtypes of homicide and violence are regarded as ‘heuristic devices’ and can therefore be thought of as latent constructs in the data. LCA is therefore a suitable technique to identify subtypes in the data since this technique assumes the types to be identified are related to a latent variable. It was also argued that multilevel LCA should be modelled due to the hierarchical structure of both datasets used in the study. The use of multilevel LCA modelling is quite rare in criminology overall and this is the first instance this specific method has been used in this way to identify subtypes of violence and homicide. This technique allows the researcher to take nested data structures into account while simultaneously examining latent constructs in complex survey data and has proven very useful for the current study. This further highlights the potential and value for using advanced statistical methods and fully acknowledging the complex structures of data. Although less complex methods could have been used, these would not have represented the data as well and could consequently have led to interpretation error and less validity of the results. The methods used in the current study are consequently part of the original contribution of the thesis since there are no published examples of the use of this method to identify subtypes of homicide or violence previously.

This chapter, along with the previous chapter, has outlined the data and methodology of the thesis, beginning with the description of the datasets and ending with the exact details of the modelling. The next chapter will therefore describe the initial results of the single-level homicide models.

Chapter 6: Descriptive Statistics and LCA of Homicide Data

6.1 Introduction

Moving on from the description of methods, this chapter will present the initial results of the thesis. It will be argued that the best way of analysing the homicide data is to start with single-level LCA models examining the victim, the offender and the incident variables separately. As discussed in earlier chapters, these three sets of variables are arguably the three different elements of which a homicide case consists, and in order to identify subtypes that tap into all dimensions of a homicide case, all these aspects need to be included in the analysis. As discussed in Chapter 5 (section 5.3.1.1), three separate models were run before the two-level LCA model in order to determine what variables to include in the two-level model, as well as examining these single level typologies in their own right. This chapter is divided into three sections describing the three single-level LCA models of the homicide data: one model of the victim variables; one model of the offender variables; and one model of the incident variables. These sections examine the classifying variables in each dataset and how they changed over time before the single-levels are run. The analysis from this chapter revealed that the best fitting identified models included four types of victims, five types of offenders and six types of incidents. The Chapter will begin by examining the victim model.

6.2 The Victim Model

6.2.1 Descriptive data of victim variables

As discussed in Chapter 4, in order to identify a typology of homicide cases in Scotland including victim, offender and incident-level variables, three different datasets on each of these levels were identified. The victim dataset was structured so that the victims were the unit of analysis rather than the homicide case (see Chapter 4), and six classifying variables were introduced in the model (see table 6.1). These classifying variables were the variables used to identify the classes in the data. No covariates, or variables on which the typologies were examined, were included. With the victim-based dataset there were 2446 victims over all 2400 cases of homicide, and the homicides were committed between 1st of January 1990 and 31st of December 2015.

As discussed in Chapter 4, and as can be seen in table 6.1, the homicide data has issues with missingness. For example, the variables Influence by alcohol or drugs and Employment status both have more than 70% missing. That means that the LCA model estimates these values based on 30% of the variables. When the missingness was analysed in Chapter 4, it was discovered that the missingness decreased over time and that the first ten years of the data had the highest level of missingness. The high level of missingness prevalent in the homicide data risked skewing the results as well as the models. However, when the three single-level models of homicide (the victim model, the offender model and the incident model) were run on the 16-year dataset (2000-2015), which has considerably less missing values, it was found that the models in both datasets were virtually indistinguishable (see appendices: 6.3; 6.6; and 6.8). This suggests that the missingness did not have a great impact on the single-level models and it was therefore decided to use the 26-year dataset (1990-2015) for the victim, offender and incident modelling in this Chapter in order to provide more information about the long-term trends in the characteristics of homicide. See Chapter 5, section 5.3.1.1 for further discussion.

The following sections will therefore explore data where the values are known (valid percent) and with the exception of table 6.1, 6.4 and 6.7, the missingness will not be reported. This was done in order to get a better understanding of what the valid data looked like, both overall and regarding changes over time. For a more detailed discussion about missingness of the homicide data, see Chapter 4, section 4.3.8.

Table 6.1: Classifying variables of the LCA victim models

Victim variables		Valid N (%)	Missing (% of total)
Gender	Male	1933 (79.0%)	0 (0.0%)
	Female	513 (21.0%)	
Influenced by alcohol or drugs	Under the influence	513 (82.7%)	1826 (74.6%)
	Sober	107 (17.3%)	
Ethnicity	White	1582 (97.8%)	829 (33.9%)
	Other than white	35 (2.2%)	
Residential status	Homeless	24 (2.2%)	1372 (56.1%)
	Not homeless	1050 (97.8%)	
Employment status	Unemployed	471 (65.0%)	1721 (70.4%)
	Employed	254 (35.0%)	
Age	Under 16 years old	157 (6.4%)	0 (0.0%)
	Between 16 and 30 years old	848 (34.7%)	
	Between 31 and 45 years old	776 (31.7%)	
	Between 46 and 60 years old	469 (19.2%)	
	Between 61 and 75	142 (5.8%)	
	76 years old and above	54 (2.2%)	

Note 1: Source: SHD. Base: n=2446.

Note 2: For definition of each variable see section 4.3.5.

Note 3: Valid percentage was calculated based on the number of victims with the missingness excluded.

As shown in table 6.1, when examining the classifying variables of the victims, it was revealed that the majority of the victims were male. When this information was known,

it was more common for the victims to be under the influence of drugs or alcohol at the time of death than it was for the victims to be sober. The majority of victims were of white ethnicity and a very small number of the victims were homeless (see table 6.1). When this information was known, it was more common for the victim to be unemployed than employed. The most common age of the victims was between 16 and 30 years old, with approximately 35% of all the victims being this age (see table 6.1). Another third of the victims were between 31 and 45 years old, and another fifth were between 46 and 60 years old.

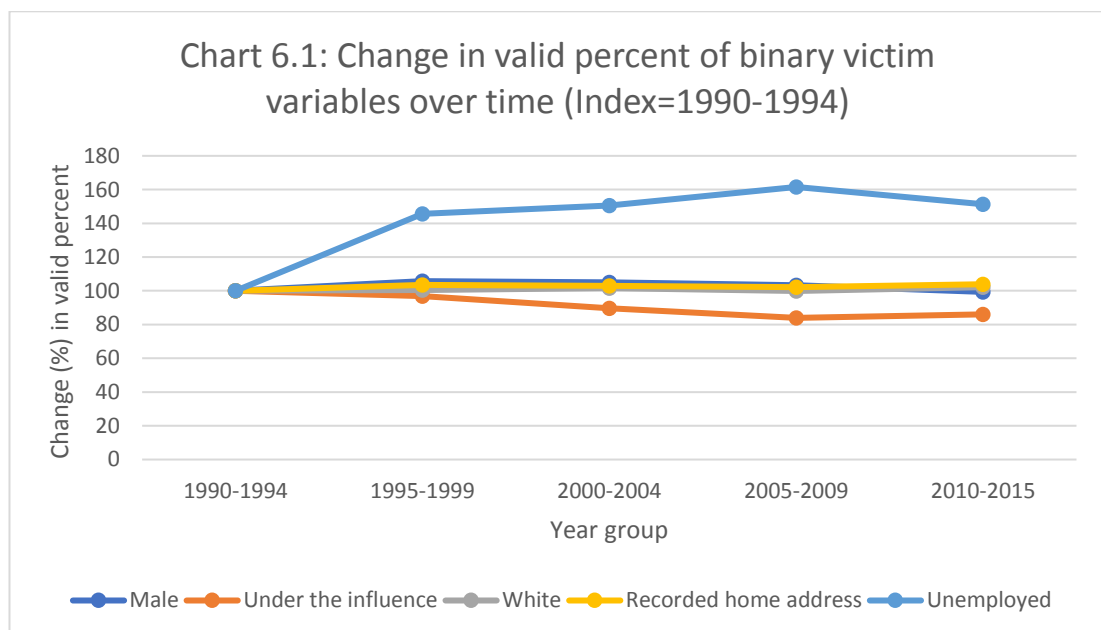
6.2.2 Change in victim variables over time

The following section outlines the change in the victim variables over time as this provides an overview of the how the most common features of victims of homicide in Scotland have changed before any classes were identified. The classes will be based on patterns of all of these variables combined, meaning that the classes might reveal trends in the data that remain hidden when examining the aggregated data. This descriptive analysis of the change in the variables over time therefore provides an important baseline to which the classes can be compared.

As mentioned, the dataset spanned over 26 years in total, from 1990 to 2015. In order to examine change over time it was decided to divide this time period into year groups as equal in size as possible. This was preferred over examining the change for each individual year for two reasons: firstly, the data included a relatively low total n, meaning that the number of cases per year was very low. This would diminish the power of any conclusions from a year-on-year analysis. Secondly, since one of the main objectives of this thesis was to examine the change in trends over time, it was assumed that distinct change would be more evident if multiple years were combined. The change in homicide between one year and the next might be rather small, and such changes can cause some 'noise' in the trends over time. It was assumed that some of this 'noise' in the data would be lost if more years were grouped together. The years

were therefore divided into five year-groups: 1990-1994; 1995-1999; 2000-2004; 2005-2009; and 2010-2015⁶⁵.

The valid⁶⁶ change in the binary variables was plotted out against the year-groups in chart 6.1. The trends in charts 6.1-6.2 were indexed, which means that each line in the plot demonstrate the individual change in that particular variable relative to the first year-group. As can be seen, ethnicity, recorded home address and gender remained relatively stable over time, whereas the valid percent of unemployed victims appears to have increased over time. In 2010-2015, there were 50% more unemployed victims compared to 1990-1994. Contrastingly, the number of victims being under the influence appears to have decreased over time. In 2010-2015, there were approximately 15% less victims who were under the influence of either alcohol or drugs at the time of death compared to 1990-1994.



Note 1: Source: SHD. Base: n=2446.

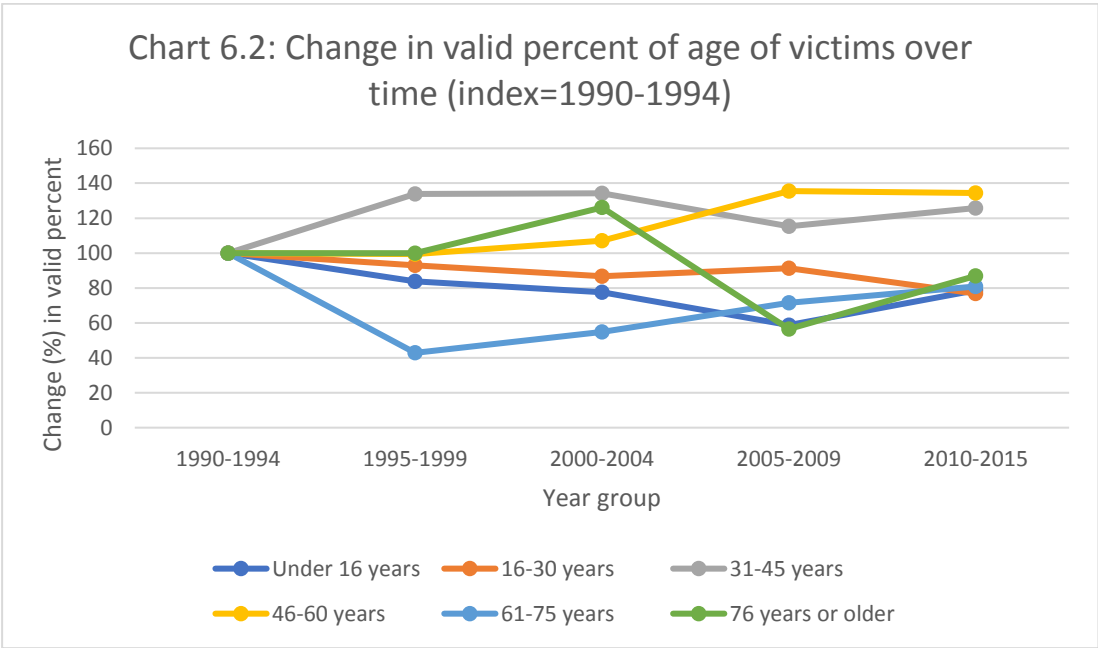
Note 2: For information of valid percent see table 6.2 note 3.

When the change in valid percent of victim age was examined over time, it was found that two of the slightly older age groups appear to have increased over time: 31-45

⁶⁵ The last year groups includes one year more than the other groups in order to include all years in the data.

⁶⁶ As before, this included the valid numbers, excluding the missingness.

years old and 46-60 years old (see chart 6.2). Two of the younger age groups (under 16 years old and 16-30 years old) had both decreased slightly over time. The two very oldest age groups (61-75 years old and 76 years and older) both fluctuated somewhat before demonstrating a slight increase in the latest year of the dataset. Overall, this would indicate that the victims were slightly older in the later years compared to the earlier years of the data.



Note 1: Source: SHD. Base: n=2446.

Note 2: For information of valid percent see table 6.2 note 3.

Overall, the current and the previous section have outlined the descriptive characteristics of the victim dataset. When examining the change in valid percent of the victim variables it was found that most variables appear rather stable over time. As previously mentioned however, hidden countertrends can be discovered in the data when the data is disaggregated. The following section will therefore disaggregate the victim data by submitting the dataset to single-level LCA modelling.

6.2.3 Single-level LCA of victim variables

6.2.3.1 Deciding on the number of classes

The single-level model of the victim data was run with up to eight classes specified in order to find the best fitting model of the data (see table 6.2). The single-level victim

model was run on the full victim sample, including the missing values in order to get more accurate and reliable results. As mentioned in Chapter 5, five statistical measures were examined in order to decide on the number of classes alongside the substantive interpretation of the models (see table 6.2). The models with the best indicated fit from the statistical measures were examined in greater detail before the decision on the number of classes was made. As can be seen from table 6.2, the different measures do not agree on the number of classes with the most optimal solution. While both the BIC and the ABIC statistics would indicate that the two-class model was the best fitting model, the four-class model had the lowest AIC value. Additionally, the seven-class model had the highest entropy value. The percent change in BIC would however indicate that all change in model fit between the models was quite marginal (see table 6.2). This led to further substantive examination of these three models (the two-class model, the four-class model and the seven-class model) (see Appendices 6.1 and 6.2)⁶⁷.

Table 6.2: Class selection statistics of victim LCA models

No. of classes	Loglikelihood value	AIC	BIC	Percent change in BIC	ABIC	Entropy
1	-5896.98	11813.97	11871.99	N/A	11840.21	N/A
2	-5795.56	11633.12	11754.96	-0.99	11688.23	0.565
3	-5773.96	11611.91	11797.57	0.36	11695.90	0.384
4	-5754.77	11595.54	11845.02	0.40	11708.40	0.481
5	-5747.43	11602.86	11916.16	0.60	11744.59	0.552
6	-5743.63	11617.26	11994.38	0.67	11787.86	0.600
7	-5737.80	11627.61	12068.54	0.62	11827.07	0.677
8	-6158.35	12506.70	13090.80	8.47	12788.94	0.653

Note 1: Source: SHD. Base: n=2446.

Note 2: For definition of the fit statistics see Chapter 5.

Note 3: Best values highlighted in bold.

⁶⁷ The models which were not chosen but examined in greater detail will throughout this thesis be described in the appendices rather than the main text for spatial reasons.

Although the two-class model had the best BIC and ABIC, it only disaggregated two classes which, when comparing this model with the other models, would indicate a substantive loss of information. Seeing that the two-level model proved too simplistic to provide an in-depth understanding of different types of victims of homicide, this model was excluded. When comparing the four-class model to the seven-class model it was found that the many classes identified in the seven-class model were difficult to distinguish, despite the improved entropy. The four-class model was the easiest to interpret, as well as more substantively meaningful compared to the two-class model. It was therefore decided that the four-class model was the best fitting model for the victim data.

6.2.3.2 Four-class victim model description

The four-class model consisted of two large⁶⁸ classes of equal size (Class 1, 40.4%; and Class 2, 38.9%), a medium sized class (Class 3, 17.3%) and one small class (Class 4, 3.4%). When the four-class model was examined in greater detail, names of the classes could be given based on the characteristics of the classifying variables in each class (see charts 6.3-6.4 and table 6.3).

Table 6.3: Names for the classes in the four-class victim model

Class number	Class name	Number	Percent (%)
Class 1	Young Unstable Male	987	40.4%
Class 2	Old Unstable Male	951	38.9%
Class 3	Female	424	17.3%
Class 4	Stable Male	84	3.4%
Total:		2446	100%

Note 1: Source: SHD.

Note 2: Since the classes are estimated by posterior probabilities, the number of people in each class is rounded.

⁶⁸ Based on the criteria of: Very small (less than 3%); Small (3-9%); Medium (10-33%); Large (34% and above). This is based on the notion that any class that contains roughly more than a third (33.3%) of the cases would be considered large.

Charts 6.3 and 6.4 demonstrate the class response probabilities of each class, plotted out against the classifying variables. The class probabilities are estimates for each class's average score on each of the observed classifying variables. These charts provide a visual representation of how the four classes differ on these variables⁶⁹. Class 1 (40.4%) was labelled Young Unstable Male, since this class exclusively consisted of young, male victims who were under the influence of drugs or alcohol at the time of murder (see chart 6.3). About half (55.2%) of the victims in this class were unemployed, and the most common age of this group was 16-30 years old (see chart 6.4). Overall, this would suggest a rather unstable lifestyle. This class was one of the larger classes, constituting two fifths (40.4%) of all victims.

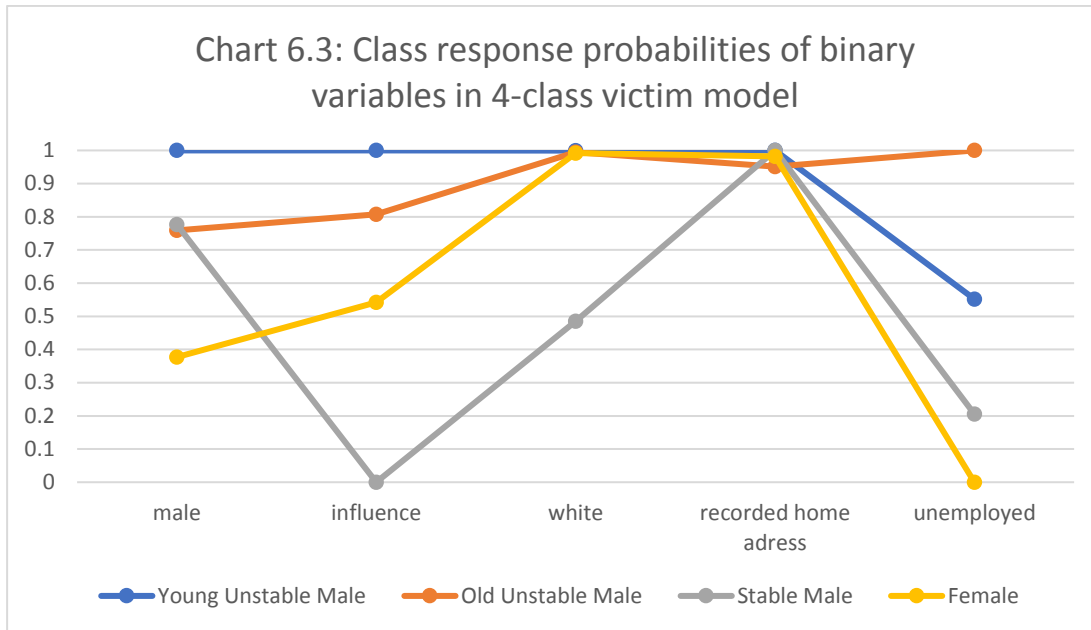
Class 2 (38.9%) was called Old Unstable Male, and was very similar to the Young Unstable Male but, as the name suggests, was slightly older. The most common age of this class was 31-45 years old, and most of these male victims were under the influence of drugs or alcohol at the time of murder. All of the Older Unstable Males were unemployed.

Class 3 (17.3%) was called Female, since more than three fifths of the victims in this class were female (see chart 6.3). This class demonstrated signs of a more stable lifestyle. Although half (54.2%) of the victims in this class were under the influence of drugs or alcohol at the time of murder, all of the Female victims were employed and the vast majority had a stable home address. The age was quite mixed in this class, but approximately 45% of the victims were younger than 30 years old.

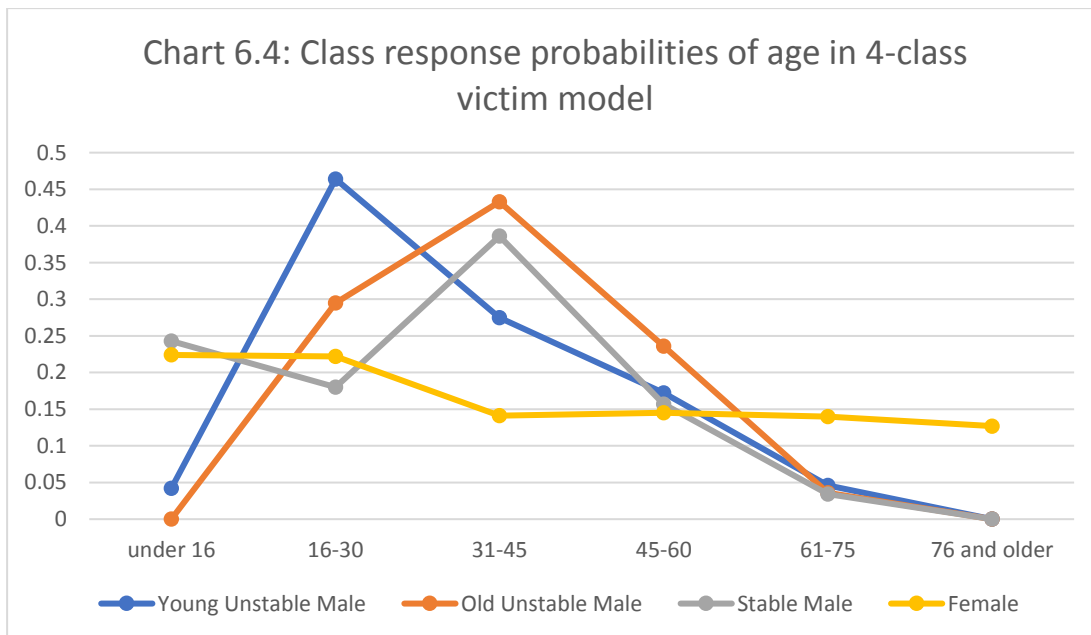
The fourth and smallest class (3.4%) was called Stable Male, because the majority of these victims were male and employed. This class had the highest level of non-white victims, with approximately half of the victims being non-white (see chart 6.3). All of the Stable Male victims were sober at the time of death and the most common age for this class was 31-45 years old. This would suggest that the Stable Male class had a

⁶⁹ Line charts are used for the victim and offender models in this Chapter since these charts were deemed to provide the easiest interpretation. The incident model and the two-level models of both homicide (Chapter 7) and violence (Chapter 8) were however illustrated using bar charts. This was decided because these models had substantially more classifying variables and it was decided to change chart type for illustrative purposes in order to facilitate the interpretation of the models.

rather stable lifestyle, and that the murder did not occur in the context of intoxication on part of the victim.



Note 1: Source: SHD. Base: n=2446.



Note 1: Source: SHD. Base: n=2446.

6.2.4 Conclusions of victim typology

When examining the different model solutions it would appear that the four-class model offered the best substantive interpretation of the data. It is important to note, however, that the entropy value was relatively low (0.48), suggesting difficulties in discerning the classes from one another. One possible reason for this low entropy value might be the relatively high level of missingness in certain variables. As discussed in Chapter 5, section 5.3.1.1 however, the missingness in the early years of the dataset did not seem to have a substantive impact on the results (see Appendix 6.3 for comparison). For the purposes of the single-level victim model, it is therefore taken that although the model contains a relatively high level of missingness, it still has informative value to the study. The victim-model provided an understanding of the most appropriate number of victim classes as well as what variables that have great importance on the classes. Both of which will be important when running the multilevel model in Chapter 7.

The four-class victim model included four different types of victims, disaggregated on the basis of their gender, age, and general lifestyle stability. The classes were called: Young Unstable Male; Old Unstable Male; Female; and Stable Male. The two unstable classes together constituted about four fifths of the victims, suggesting that an unstable lifestyle (with high levels of unemployment and influence of drugs or alcohol) is very common among victims of homicide in Scotland. As a result, these two types reflected the most common characteristics of the aggregated data of the victims (see section 6.3.1). The Female and Stable Male types were relatively obscured in the aggregate data as they were much less prevalent, but this typology approach proved valuable in terms of identifying them.

Very few studies to date have examined typologies of homicide victims alone; most typologies have either focused on offenders of homicide or included multiple variables relating to victims, offenders and the incident. One of the few studies that have identified a victim typology of homicides (Pizarro et al., 2011) examined previous criminality of the victim, which could not be included in the current study. Despite this, there were some similarities between the two types identified by Pizarro et al.,

(2011) and the victim types identified in the current study. The type Pizarro et al., identified which had high levels of previous violent crime also had high levels of drug charges, suggesting some similarities to the Young Unstable Male and the Old Unstable Male types in the current study. Similarly, the type Pizarro et al., (2011) identified which had lower levels of these previous convictions demonstrate some similarities to the Stable Male type in the current study.

In the next section, the offender variables will be outlined and submitted to LCA-modelling, and the best fitting model for this data will be determined.

6.3 The Offender Model

6.3.1 Descriptive data of offender variables

This section describes the offender variables in the homicide dataset and how they changed over time, before a single-level LCA model of the offender variables is examined. As with the victim dataset, the offender dataset was structured so that the offenders were the unit of analysis rather than the homicide case (see Chapter 4), and seven classifying variables were introduced in the model (see table 6.4). No covariates, or variables on which the typologies were examined, were included. With the offender-based dataset there were 3458 offenders over all 2400 cases of homicide, and the homicides were committed between 1st of January 1990 and 31st of December 2015. As with the victim data, the descriptive analysis will be conducted on the data where the values are known (valid percent).

The vast majority of offenders was male (see table 6.4). As with the victims, when this information was known, it was more common for the offenders to be under the influence of drugs or alcohol at the time of homicide than it was for the offender to be sober.

Table 6.4: Classifying variables of the LCA offender models

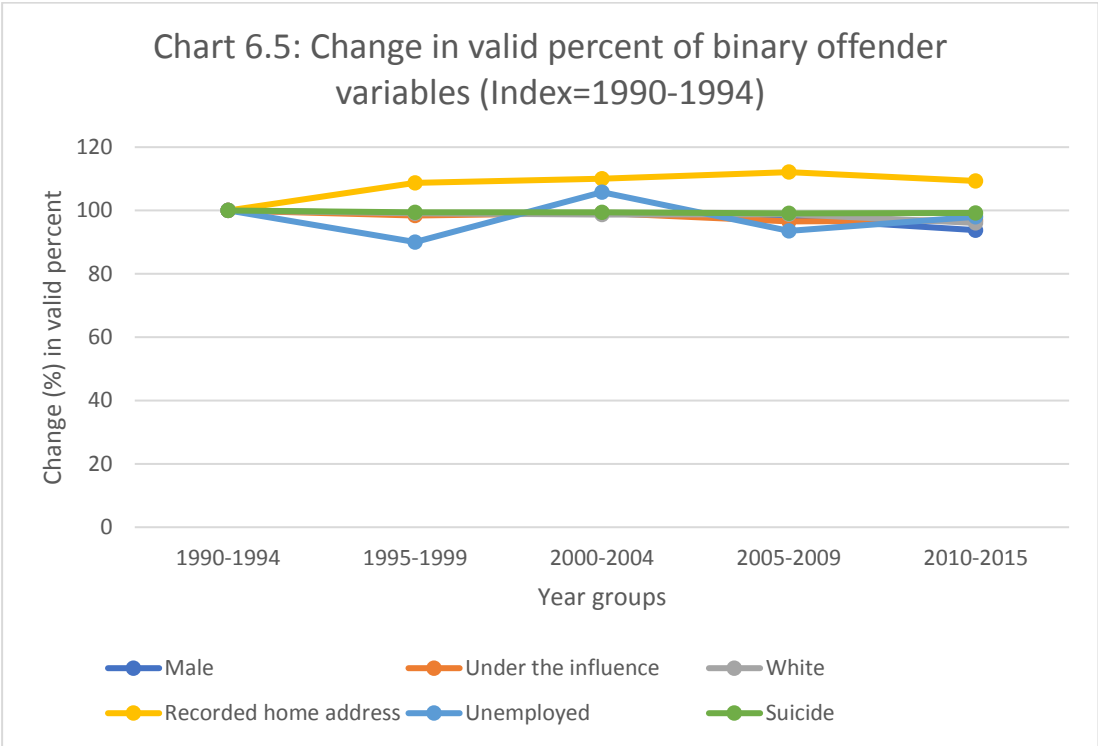
Offender variables		Valid N (%)	Missing (% of total)
Gender	Male	3117 (90.2%)	0 (0.0%)
	Female	341 (9.8%)	
Influenced by alcohol or drugs	Under the influence	556 (93.3%)	2861 (82.7%)
	Sober	40 (6.7%)	
Ethnicity	White	2425 (97.6%)	974 (28.2%)
	Other than white	59 (2.4%)	
Residential status	Homeless	55 (3.5%)	1903 (55.0%)
	Not homeless	1500 (96.5%)	
Employment status	Unemployed	919 (72.3%)	2861 (82.7%)
	Employed	352 (27.7%)	
Suicide	Suicide	29 (3.2%)	0 (0.0%)
	No suicide	3345 (96.8%)	
Age	Under 16 years old	111 (3.2%)	0 (0.0%)
	Between 16 and 30 years old	2065 (59.7%)	
	Between 31 and 45 years old	957 (27.7%)	
	Between 46 and 60 years old	274 (7.9%)	
	Between 61 and 75	44 (1.4%)	
	76 years old and above	2 (0.1%)	

Note 1: Source: SHD. Base: n=3458

It was more common for the offenders to be unemployed than employed. Most of the offenders were of white ethnicity and a very small number of offenders were homeless (see table 6.4). In about 3% of cases the offender committed suicide after the homicide had been committed. The most common age of the offenders was between 16 and 30 years old, with approximately three fifths of all the offenders being this age (see table 6.4). Overall, the demographic characteristics of the offenders appear to be very similar to the victims of homicide.

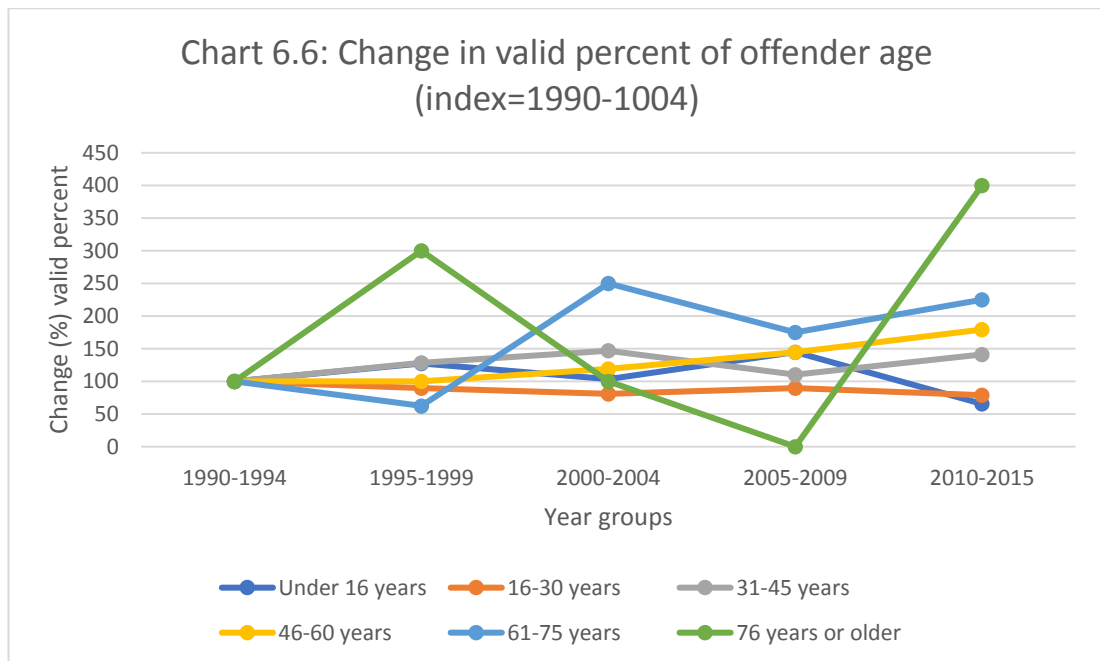
6.3.2 Change in offender variables over time

This section outlines the change in the offender variables over which provides an important baseline to which the offender subtypes identified through modelling can be compared. The same year-groups were chosen as for the victim data: 1990-1994; 1995-1999; 2000-2004; 2005-2009; and 2010-2015⁷⁰.



Note 1: Source: SHD. Base: n=3458
 Note 2: For information of valid percent see table 6.2 note 3.

⁷⁰ The last year-group includes one year more than the other groups in order to include all years in the data.



Note 1: Source: SHD. Base: n=3458

Note 2: For information of valid percent see table 6.2 note 3.

Note 3: The actual number of 76 years or older in 1990-1994 was 0, but since the trends of the valid percent were plotted in this graph this was put as 0.1%.

The valid change in the binary offender variables was plotted out against the year groups in chart 6.5. The trends in charts 6.5-6.6 were indexed, which means that each line in the plot demonstrate the individual change in that particular variable relative to the first year-group (1990-1994). As can be seen, most variables remained stable over time. The offenders were overwhelmingly likely to be male, although there appears to be a slight decrease (6.2%) in male offenders in the later years of the data. Unemployment appears to have fluctuated somewhat over time, decreasing in 1995-1999, then increasing in 2000-2004 before stabilising in 2010-2015. It appears that having a recorded home address increased over time among the offenders. As chart 6.5 shows, 9% more of the offenders had a recorded home address in 2010-2015 compared to 1990-1994 when this variable was known. This suggests a decrease in homelessness among offenders over time.

When the change in offender age was examined over time (see chart 6.6), it was revealed that three age groups, 31-45 years old, 46-60 years old and 61-75 years old, demonstrated a slow increase over time. Contrastingly, two age groups appear to have decreased among the offenders; under 16 years old and 16-30 years old. The oldest

age group (76 years or older) appears to have fluctuated between the time groups with no clear trend. This might also be related to the small number of offenders belonging to this age group. Overall, it would seem that the age of offenders of homicide, similarly to the victims, increased over time, meaning that fewer young people were involved in committing these crimes.

The current and the previous sections have outlined the descriptive characteristics of the offender dataset. When examining the change in valid percent of the offender variables it was found that most variables appear rather stable over time. As previously mentioned however, hidden countertrends can be discovered in the data when the data is disaggregated. The following section will therefore disaggregate the offender data by submitting the dataset to single-level LCA modelling, exactly as with the victim dataset.

6.3.3 Single-level LCA of Offender variables

6.3.3.1 Deciding on the number of classes

The single-level model of the offender data was run with up to eight classes specified in order to find the best fitting model of the data (see table 6.5). The single-level offender model was run on the full offender sample, including the missing values in order to get more accurate and reliable results. As mentioned in Chapter 5, five statistical measures were examined in order to decide on the number of classes alongside the substantive interpretation of the models (see table 6.5). As with the victim model, the models with the best indicated fit from the statistical measures were examined in greater detail before the decision on the number of classes was made. As can be seen from table 6.5, the different measures are not in agreement as to the optimal number of classes. While both the BIC and the ABIC statistics would indicate that the two-class model was the best fitting solution, the AIC would indicate the three-class model as the best and the Entropy would indicate that the five-class model was the best model to disaggregate the classes. These three models (the two-class, the three-class and the five-class models) were therefore examined in greater detail in order to determine which model had the most meaningful substantive interpretation.

Table 6.5: Class selection statistics of offender LCA models

No. of classes	Loglikelihood value	AIC	BIC	Percent change in BIC	ABIC	Entropy
1	-6287.65	12597.30	12664.93	N/A	12629.98	N/A
2	-6222.40	12490.80	12632.22	-0.26	12559.14	0.461
3	-6196.41	12462.83	12678.02	0.36	12566.81	0.451
4	-6185.50	12465.00	12753.98	0.60	12604.63	0.606
5	-6174.04	12466.08	12828.83	0.59	12641.36	0.681
6	-6167.25	12476.50	12913.03	0.66	12687.43	0.602
7	-6161.44	12488.88	12999.21	0.67	12735.47	0.655
8	-6158.35	12506.70	13090.80	0.70	12788.94	0.677

Note 1: Source: SHD. Base: n=3458

As mentioned, the two-class offender model (described in appendix 6.4) had the best BIC and ABIC values, however, compared to the other two models examined it was less substantively interesting due to the fact that it only included two classes, mainly disaggregated by the variable Employment status. Some of the interesting classes emerging in the other models (such as the Female class and the Non-white Male class) were not evident in this model. This model had considerably less variation between classes and, as with the victim model, the two-class model was therefore excluded. The additional class added in the five-class model compared to the four-class model (described in appendix 6.5) appears to be a class of mostly stable, non-white offenders. Additionally, the percentage change in BIC would indicate that the five-class model was only marginally worse in fit (0.59%) compared to the four-class model. Seeing that this additional class was of substantive interest, especially since there are similarities between this class and the Stable Male class in the victim typology, the five-class model was considered favourable to the four-class model and was considered to describe the data most accurately.

The variable measuring a recorded home address did not appear to distinguish between the different classes of offenders across any of the three offender models examined. All classes had a high probability of having a recorded home address, regardless of model. In light of this, another five-class offender model was run without recorded home address in an attempt to increase model fit. However, when this was done, all of the models worsened significantly. This might suggest that residential status does have an indirect effect on some of the other variables in the model. It was therefore decided to keep the variable Recorded home address in the model even though it did not distinguish between the classes.

6.3.3.2 Five-class offender model description

The five-class model consisted of one large class (Class 1, 65.7%), one medium sized class (Class 2, 28.9%) and three very small classes (Class 3, 1.7%; Class 4, 2.3% and Class 5, 1.4%). When the five-class model was examined in greater detail, names of the five classes could be given based on the characteristics of each class (see charts 6.7 – 6.8, and table 6.6).

Table 6.6: Names for the classes in the five-class offender model

Class number	Class name	Number	Percent (%)
Class 1	Unemployed Male	2271	65.7%
Class 2	Younger Employed Male	1001	28.9%
Class 3	Older Employed Male	57	1.7%
Class 4	Female	81	2.3%
Class 5	Non-white Male	48	1.4%
Total:		3458	100%

Note 1: Source: SHD.

Note 2: Although the Female class was slightly larger than the Younger Employed Male class, the Younger Employed Male class was still placed above the Female class in the table due to the stark similarities with the Older Employed Male class.

Class 1 (65.7%), which was the biggest class, was labelled Unemployed Male since most offenders in this class were male and unemployed. The Unemployed Males also tended to be under the influence of alcohol or drugs at the time when the homicide was committed, which also could indicate a more unstable lifestyle, similar to the Unstable Male of the victim typology. Most of the Unemployed Males were between 16 and 30 years old (65.6%).

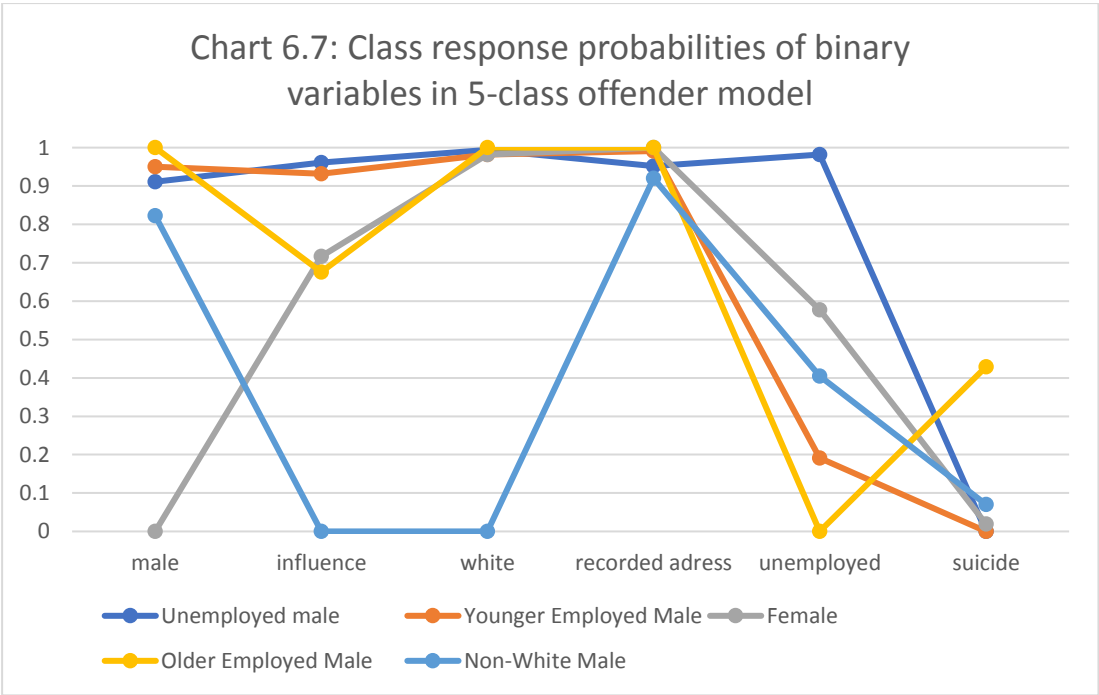
Class 2 (28.9%) was labelled Younger Employed Male since all offenders in this class were male and since the majority of the offenders of this class was employed, unlike the Unemployed Males. The Younger Employed Males were quite young, as the name would suggest, with a most common age of 16-30 years old (see chart 6.8). The vast majority of the Younger Employed Males were under the influence of alcohol or drugs at the time of homicide and none of the offenders in this class committed suicide after the homicide.

Class 3 (1.7%) was named Older Employed Male. This class was very similar to the Younger Employed Males (see above) however the Older Employed Males were slightly older (see chart 6.8). The most common age of the Older Employed Males was 31-45 years old, with approximately another 40% of the offenders being older than 45 years old. The majority of the Older Employed Males were of a white ethnicity and were under the influence of drugs or alcohol at the time of homicide. Although most of the Older Employed Males did not commit suicide after the homicide, this class had a higher probability of committing suicide compared to the other classes (see chart 6.7); approximately 43% of the Older Employed Males committed suicide after they committed the homicide.

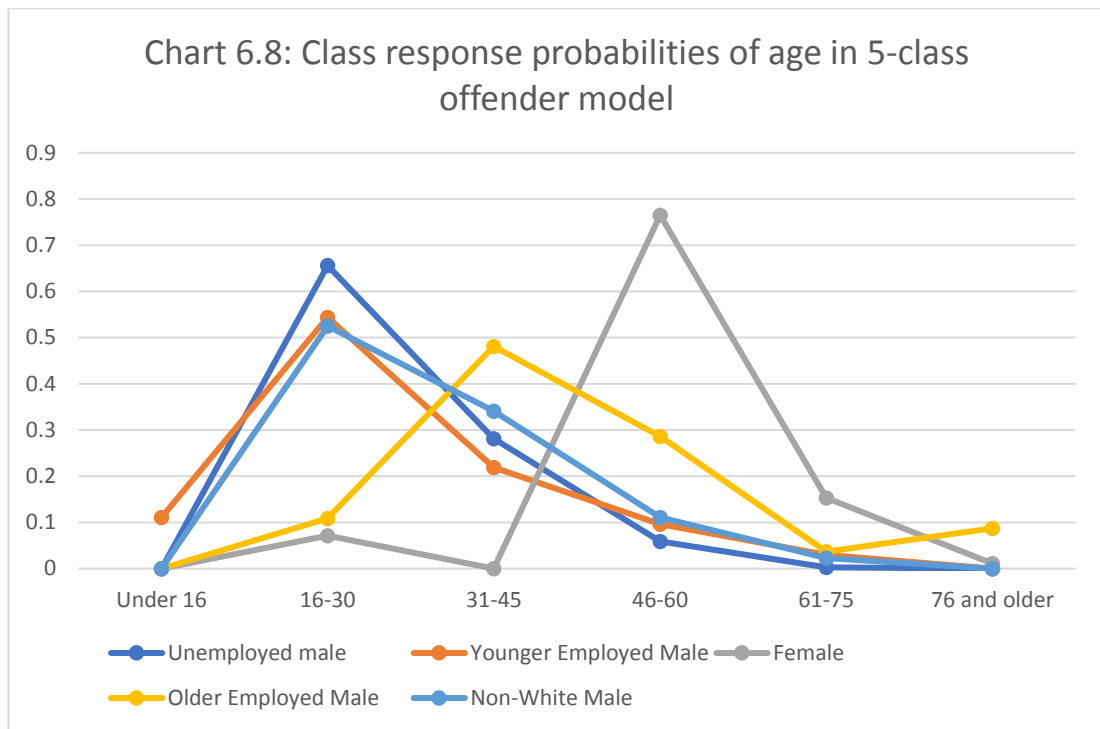
Class 4 (2.3%) was labelled Female since this class consisted entirely of female offenders. Most of the Females had been under the influence of alcohol and drugs at the time of homicide and close to 60% were unemployed. Very few of the Female offenders committed suicide after they had committed the homicide. The Females had noticeably less variation regarding the age bands, with the majority (76.5%) of the Female offenders were aged between 46 and 60 years old. None of the Females were

aged under 16 years old or between 31 and 45 years old, demonstrating a very different age profile compared to the other classes (see chart 6.8).

Class 5 (1.4%) was named Non-white Male. This class consisted only of offenders of an ethnicity other than white and the majority (82.3%) of this class was male. The Non-white Males had a higher probability of being sober at the time of the homicide compared to the other classes; all of the Non-white Males were sober at the time of homicide. Most of the Non-white Males were employed. Compared to the other classes, the Non-white Males appeared to have a quite stable lifestyle, and this class was therefore similar to the Stable Males of the victim typology. The age of the Non-white males was quite evenly spread across the age bands, with 16-30 being the most prevalent age group.



Note 1: Source: SHD. Base: n=3458



Note 1: Source: SHD. Base: n=3458

6.3.4 Conclusions of offender typology

When examining the different model solutions, it would appear that the five-class model offers the most meaningful substantive interpretation of the offender data. Although not strictly a measure of fit, the five-class model had the highest entropy, which suggest that the classes were more clearly defined in this model (see table 6.5). This model had the highest substantive value compared to the other two models examined in detail. The five classes of homicide offenders identified in the model were primarily distinguished by their gender, age and employment, similarly to the victim model. The classes were named: Unemployed Male; Younger Employed Male; Older Employed Male; Female; and Non-white Male.

Overall, there were some stark similarities to the victim types identified. The Non-white Male offenders were very similar to the Stable Male victims, and the two Female classes were also quite similar. The Unemployed Male offender class was very similar to the Younger and Older Unstable Male victim classes and was the class that reflected the most common characteristics of offenders overall in Scotland (see section 6.3.1). Although the victim and offender typologies shared many similarities, it appears that

there was a higher proportion of instability among the victim classes. As mentioned in the previous section, close to 80% of the victims demonstrated signs of a rather unstable lifestyle, whereas the corresponding figure for the offenders is about to 65% percent. Although this would suggest a high level of vulnerability across both victims and offenders alike, this could also suggest a higher vulnerability among the victims compared to the offenders. The victims also tended to be slightly older compared to the offenders.

Although there were very few differences between the models in the 16-year dataset (see Appendix 6.6) and the 26-year dataset, suggesting that missingness has limited impact on this data, missingness stands out as one of the biggest issues with the offender model. Some variables had as high as 80% missing data, meaning that only 20% of the cases are used to estimate the value of the classes. This might lead to decreased reliability and validity of the model, and it was therefore important, as with the victim model, that these issues were resolved before a multilevel model of homicide was identified.

Some of the offender classes found in the current study bears some resemblance to the typology of homicide offenders developed by Thomas et al., (2011). Although their typology was primarily based on the relationship to the victim (Intimate Partner murder vs Non-Intimate Partner murder), they found that the Intimate Partner murderer had a more conforming and stable lifestyle compared to the Non-Intimate Partner murderer with higher levels of employment and education. Thomas et al. also found that the Intimate Partner murderer seemed to be older than the Non-Intimate Partner murderer. Although the relationship between offender and victim was not included in the current offender typology as this was an incident-level variable, the two types of homicide offenders found by Thomas et al. are similar to the Older Employed Male and Unemployed Male offender classes of the current study.

The third and last section of the chapter will examine the descriptive characteristics of the incident variables as well as the single-level model of the incident dataset.

6.4 The Incident Model

6.4.1 Descriptive data of incident variables

This section will describe the incident variables in the homicide dataset, both overall and across the five different time groups, before a single-level LCA model of the incident variables is examined. Since the original dataset was based on the case or incident-level, there was no need to reconstruct another dataset for this analysis (see Chapter 4). Twenty-seven classifying variables were introduced in the model (see table 6.7). No covariates, or variables on which the typologies were examined, were included. The incident-based dataset consisted of 2400 cases of homicide committed between 1st of January 1990 and 31st of December 2015. As with the victim and offender data, the descriptive analysis will be conducted on the data where the values are known (valid percent).

As can be seen from table 6.7, the most common Method of killing was the use of a sharp instrument; more than half of the cases included this method of killing when this variable was known. As described in Chapter 4, Method of killing is a combined construct coded from the weapon used and cause of death variables. The second most common method of killing was killing without the use of a weapon, which constituted approximately a fifth of all the cases. Another fifth of the cases included physical assault as the method of killing (see table 6.7). When the relationship between the offender and the victim was examined, it was revealed that the most common relationship was someone known, a friend or an acquaintance (see table 6.7). This was followed by a relative (including parents), and an intimate partner. Only about 8% of all the homicide cases included stranger-killings.

When the motive for the homicide was examined (see table 6.7) the most common motive was some sort of fight, rage or quarrel; approximately half of all homicides were described to have this motivation when this variable was known. Fight, rage or quarrel as motivation was followed by feud-related homicides with about one in ten being motivated by some sort of feud or faction rivalry. Another 6% were motivated by jealousy or revenge and yet another 6% of the cases had a financial motive. Only

about 3% of all homicides were sexually motivated, meaning that this sort of homicide appears to be quite uncommon in Scotland.

Table 6.7: Dependent variables of the LCA incident models

Case variables		Valid N (%)	Missing (% of total)
Method of Killing	Sharp instrument	1107 (54.2%)	356 ⁷¹ (14.8%)
	Blunt instrument	363 (17.8%)	359 (15.0%)
	Shooting or firearm	113 (5.5%)	363 (15.1%)
	Fire	43 (2.2%)	400 (16.7%)
	No weapon used	458 (22.5%)	364 (15.2%)
	Strangulation or ligature	286 (14.0%)	361 (15.0%)
	Physical assault	444 (22.2%)	400 (16.7%)
	Other	248 (11.8%)	306 (12.8%)
Relationship between offender and victim	Known or Acquaintance	546 (48.3%)	1270 (52.9%)
	Relative (including parent)	187 (16.5%)	
	Rival	139 (12.3%)	
	Intimate partner	178 (15.8%)	
	Stranger	88 (7.8%)	
	Other	4 (3.5%)	
Motive	Fight, rage or quarrel	983 (53.3%)	554 (23.1%)
	Financial (including theft)	122 (6.6%)	

⁷¹ Method of Killing has varying numbers of missing since this variable was combined from two previous variables (see footnote 40).

	Insanity	60 (3.3%)	
	Jealousy or revenge	124 (6.7%)	
	Sexually motivated	61 (3.3%)	
	Domestic	110 (6.0%)	
	Feud	131 (7.1%)	
	Other ⁷²	103 (5.6%)	
	Unknown ⁷³	199 (10.8%)	
Rural or urban location	Rural	36 (4.8%)	1656 (69.0%)
	Urban	692 (93.0%)	
	Both	16 (2.2%)	
Public or private location	Public	511 (42.2%)	1190 (49.6%)
	Private	644 (53.2%)	
	Both	55 (4.5%)	
Inside or outside location	Inside	493 (38.9%)	1133 (47.2%)
	Outside	726 (57.3%)	
	Both	48 (3.8%)	

Note 1: Source: SHD. Base: n=2400

Note 2: See Chapter 4, section 4.3.7 for definition of variables.

Three multinomial variables were included in the single-level incident model to measure locus: Urban or Rural; Public or Private; and Inside or Outside. Each of these

⁷² Other includes mercy killings as well as homicides motivated by organised crime and motives that otherwise does not fit within any of the other categories.

⁷³ Unknown motive refers to the cases where Police Scotland could not establish the motive of the homicide

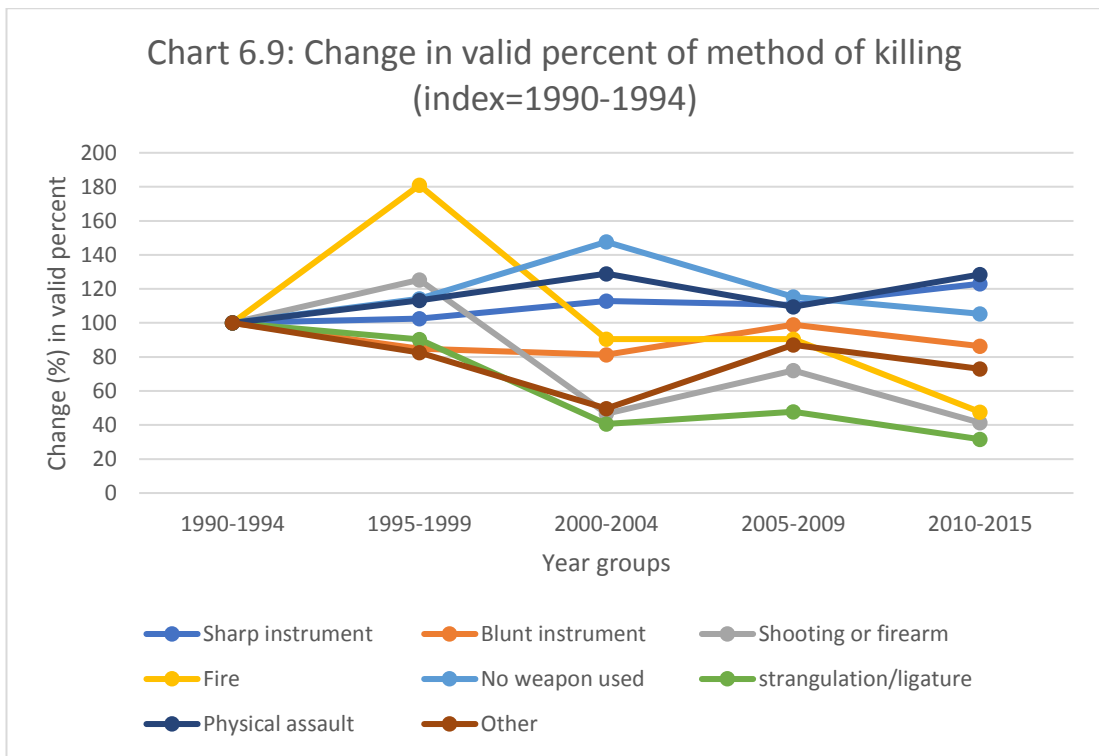
variables could also be coded as ‘both’ when there was more than one location attached to the homicide (for instance if the victim was killed in one place and the body was subsequently moved to another) or if a case included multiple victims. As table 6.7 would suggest, most cases occurred in an urban setting rather than a rural setting. Most cases also occurred in a private place rather than a public place and inside rather than outside. It was quite uncommon overall for a case to be coded ‘both’ for either of these variables.

6.4.2 Change in incident variables over time

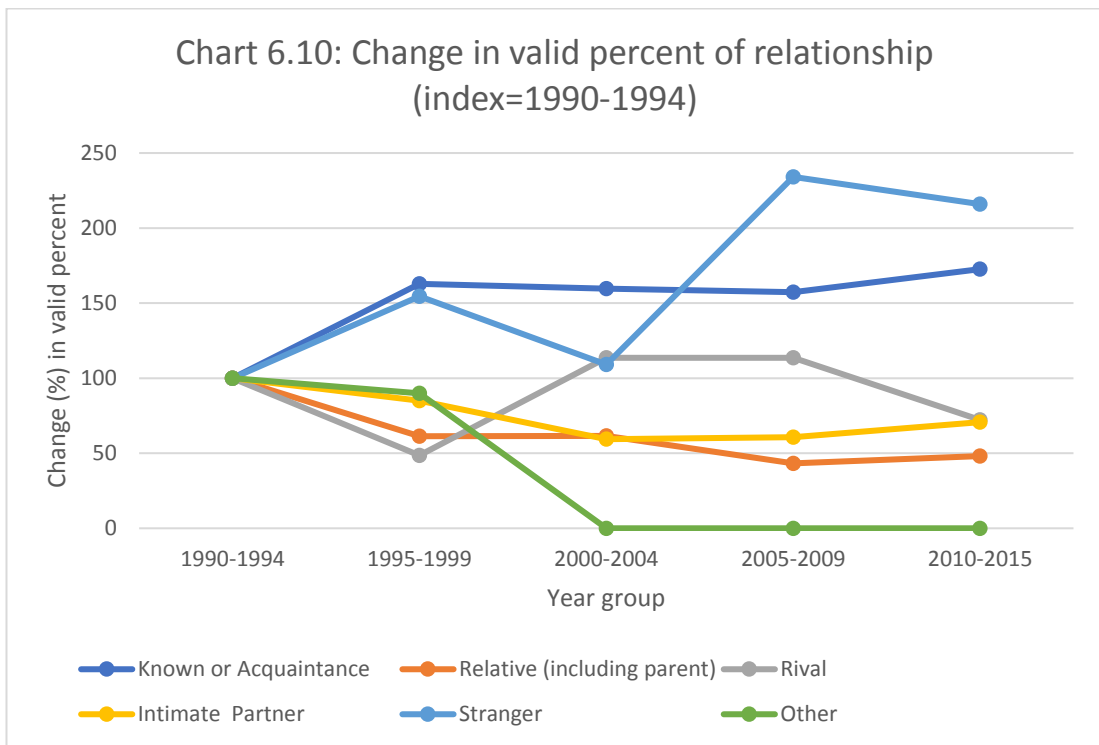
The following section outlines the change in the incident variables over time before the incident dataset is subjected to LCA modelling as with the victim and offender data. This descriptive analysis of the change in the variables over time provides an important baseline to which the incident subtypes can be compared. The same year groups were chosen as for the victim and offender data: 1990-1994; 1995-1999; 2000-2004; 2005-2009; and 2010-2015⁷⁴.

The trends in charts 6.9-6.14 were indexed, meaning that each line in the plot demonstrate the individual change in that particular variable relative to the first year group (1990-1994). When the change in valid percent of Method of killing was examined (see chart 6.9) it would seem that sharp instrument as a method of killing was higher in 2010-2015 compared to 1990-1994, as was killing without the use of weapons, and physical assault. In contrast, the other methods of killing (Blunt instrument, Other, Fire, Shooting/Firearm and Strangulation/Ligature) appeared to have decreased over time, with Strangulation/Ligature demonstrating the largest decrease (70%). Some of these percentages are however based on small numbers and should be interpreted with caution.

⁷⁴ The last year group includes one year more than the other groups in order to include all years in the data.

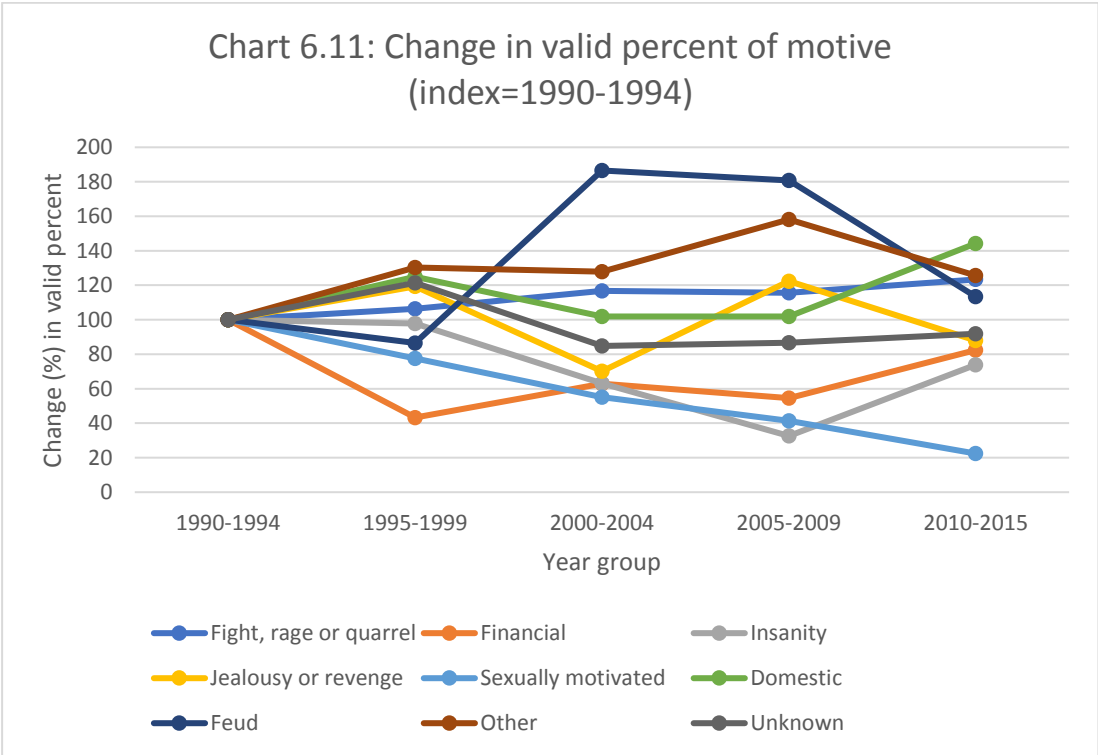


Note 1: Source: SHD. Base: n=2400



Note 1: Source: SHD. Base: n=2400

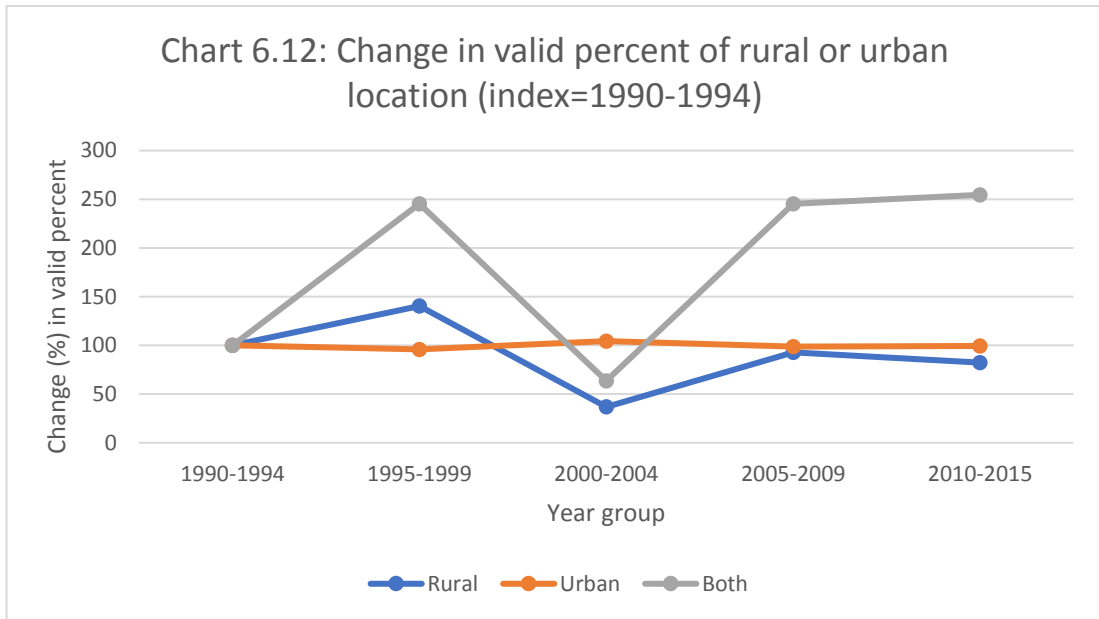
When the change in valid percent of the relationship between offender and victim was examined (see chart 6.10), two types of relationships had become more common over time: Known or Acquaintance (increased by 73% in 2010-2015 compared to 1990-1994); and Stranger (increased by 115% in 2010-2015 compared to 1990-1994). All other types of relationships (Rival; Intimate Partner; Relative; and Other) had decreased over time. The data would in other words suggest that when this variable was known, there has been a decrease in close relationship homicide such as intimate partners and relatives over time. This might however be an effect of the high level of missing data in this variable since domestically motivated homicides had increased over time (see chart 6.11).



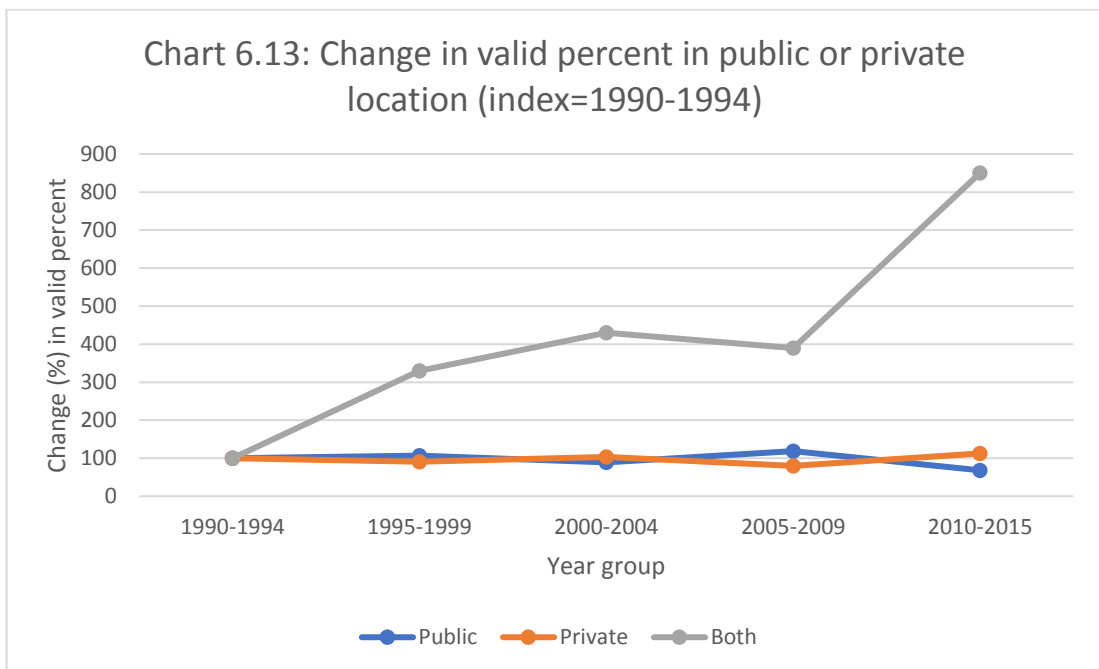
Note 1: Source: SHD. Base: n=2400

When the change in valid percent of motive was examined over time it appears that three different motives had increased: Domestic; Other; and Feud or Faction rivalry (see chart 6.11). Out of these three different motives, the domestically motivated homicides had increased the most (44%). Two other motives (Unknown, and Jealousy or revenge) appeared to fluctuate somewhat over time before stabilising to their original level in 2010-2015, and three types of motive (Financial; Insanity; and Sexual) had decreased over time. Sexually motivated homicides demonstrated the largest

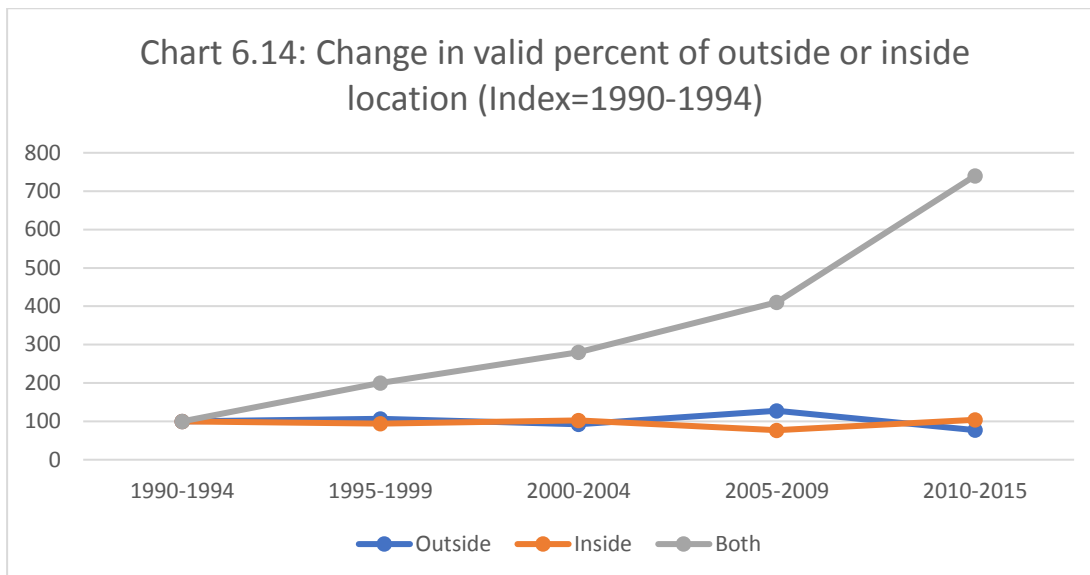
decrease; in 2010-2015 compared to 1990-1994, sexually motivated homicides had decreased by almost 80%.



Note 1: Source: SHD. Base: n=2400



Note 1: Source: SHD. Base: n=2400



Note 1: Source: SHD. Base: n=2400

When examining the change in the location variables (see charts 6.12-6.14), urban and rural locations appeared to be approximately as common in 2010-2015 as in 1990-1994, with homicide cases involving rural locations demonstrating a slight decrease over this time. Homicides involving both an urban and rural element had however increased markedly over time (see chart 6.12). This increase is however likely to be related to the low percentage in each of these categories. When this was known, only 1% of the cases in 1990-1994 included both a rural and an urban location, whereas the corresponding figure in 2010-2015 was 4.7%. Nevertheless, it seems that it is becoming slightly more common for homicide cases to include multiple elements of both types of locations examined, such as both rural and urban (see chart 6.12), public and private (see chart 6.13) and indoor and outdoor elements (see chart 6.14). Although previous examination of the data would indicate that this is not related to an increase in cases with multiple victims (see charts 4.1-4.2 in Chapter 4), this could be related to improvements in recording and coding of the original SHD dataset (see Chapter 4, section 4.3).

Homicides involving private locations had decreased by 32% in 2010-2015 compared to 1990-1994, while public locations had increased by 12% (see chart 6.13). While homicide cases with inside locations had remained stable over time, outside locations

appeared to have decreased. In 2010-2015 compared to 1990-1994, outside locations had decreased by 23%.

6.4.3 Single-level LCA of Incident variables

6.4.3.1 Deciding on the number of classes

The incident-level LCA models were run with up to six classes in order to find the best fitting model of the data (see table 6.8). A seven-class solution was attempted, but this model would not converge, even with an increase of more than 400% in random starts compared to the first model run. The single-level incident model was run on the full incident sample, including the missing values in order to get more accurate and reliable results. No covariates, or variables on which the typologies were examined, were included. As mentioned in Chapter 5, five statistical measures were examined in order to decide on the number of classes alongside the substantive interpretation of the models (see table 6.8). As with the other two models, the models with the best indicated fit from the statistical measures were examined in greater detail before a decision on the number of classes was made. As can be seen from table 6.8, all three fit statistics (AIC, BIC and ABIC) indicated that the six-class model had the superior fit. These all appeared to be decreasing with the higher number of classes however, as can also be seen from the declining percentage change in BIC (see table 6.8). Therefore, this was not enough to determine the best fitting model. The entropy was the highest for the two-class model. As with the victim and offender data, these two models (the two-class model and the six-class model) were examined in greater detail in order to establish which incident model was most substantively meaningful.

Table 6.8: Class selection statistics of incident LCA models

No. of classes	Loglikelihood value	AIC	BIC	Percent change in BIC	ABIC	Entropy
1	-18744.47	37554.95	37743.20	N/A	37638.36	N/A
2	-17036.92	34207.84	34590.06	-8.35	34377.19	0.881
3	-16339.53	32881.05	33457.24	-3.27	33136.35	0.751
4	-15803.86	31877.72	32647.87	-2.42	32218.96	0.829
5	-15422.20	31182.40	32146.51	-1.54	31609.57	0.833
6	-15129.97	30665.94	31824.02	-1.01	31179.06	0.856

Note 1: Source: SHD. Base: n=2400

When the two-class incident model was examined (see Appendix 6.7) it was found to have too few classes to be substantively interesting. Although this model had the highest entropy, the two-class model was deemed too simplistic to provide a deeper understanding of different types of homicide incidents and was therefore excluded, leaving only the six-class model. The six-class model was substantively interesting and it was therefore considered to be the best fitting model of the data.

An earlier version of this model also included a variable measuring whether there had been any evidence destruction in relation to the homicide, but since this variable failed to distinguish between any of the classes, and since model fit was improved when this variable was removed, evidence destruction was therefore excluded from the final model (see Chapter 4, section 4.3.6.1).

6.4.3.2 Six-class incident model description

The six-class model split the data into four medium sized classes (Class 1 (28.8%); Class 2 (16.0%); Class 3 (22.8%); Class 4 (17.9%)) and two small classes (Class 5 (8.4%) and Class 6 (6.1%)) (see table 6.9). When the distribution of the variables amongst the classes was examined in detail (see charts 6.8 – 6.14), names could be given to the classes (see table 6.9).

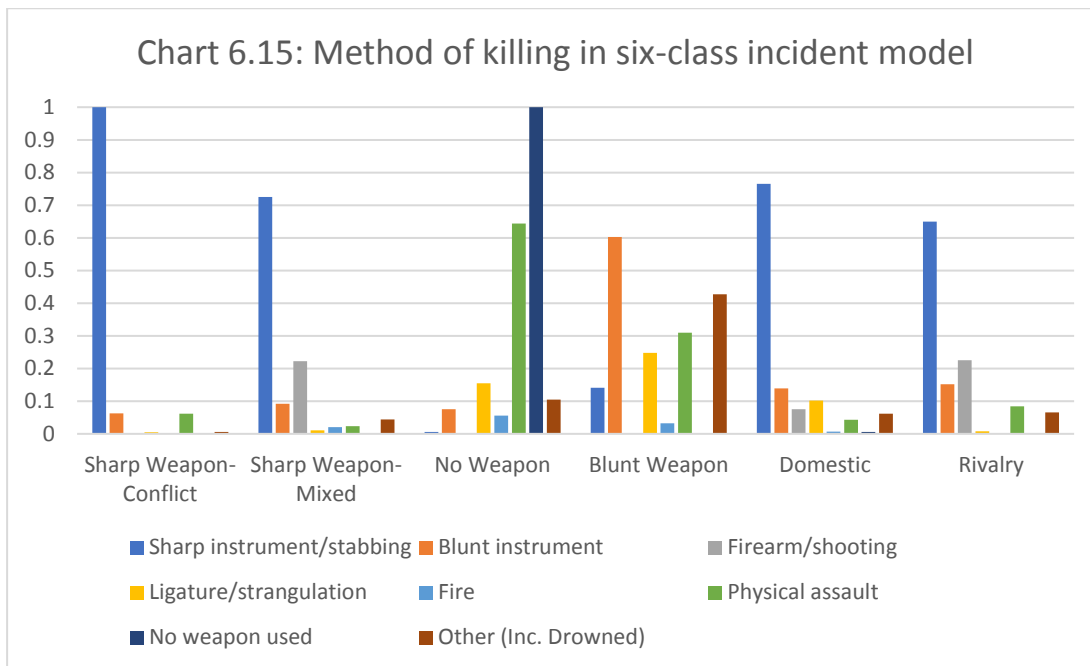
The first and biggest class (28.8%) was called Sharp Weapon-Conflict because all cases included a victim who was stabbed to death with the use of a sharp instrument (see chart 6.15) and most of these homicides were motivated by some sort of fight or conflict (see chart 6.16). The most common relationship was an associate or friend (see chart 6.17). In most cases, the weapon was brought to the scene by the offender (see chart 6.18). There was no particular pattern in regards to locus for the Sharp Weapon-Conflict Homicides; approximately as many cases occurred indoors as outdoors and in a public setting as in a private setting (see charts 6.19-6.21). Just as with the other five classes, the vast majority of the Sharp Weapon-Conflict Homicides were committed in an urban area. Overall, this class would indicate a type of homicide committed by associates or friends with the use of a sharp instrument in the context of a conflict or fight. This was the most common type of homicide overall (28.8%).

Table 6.9: Names for the classes in the six-class incident model

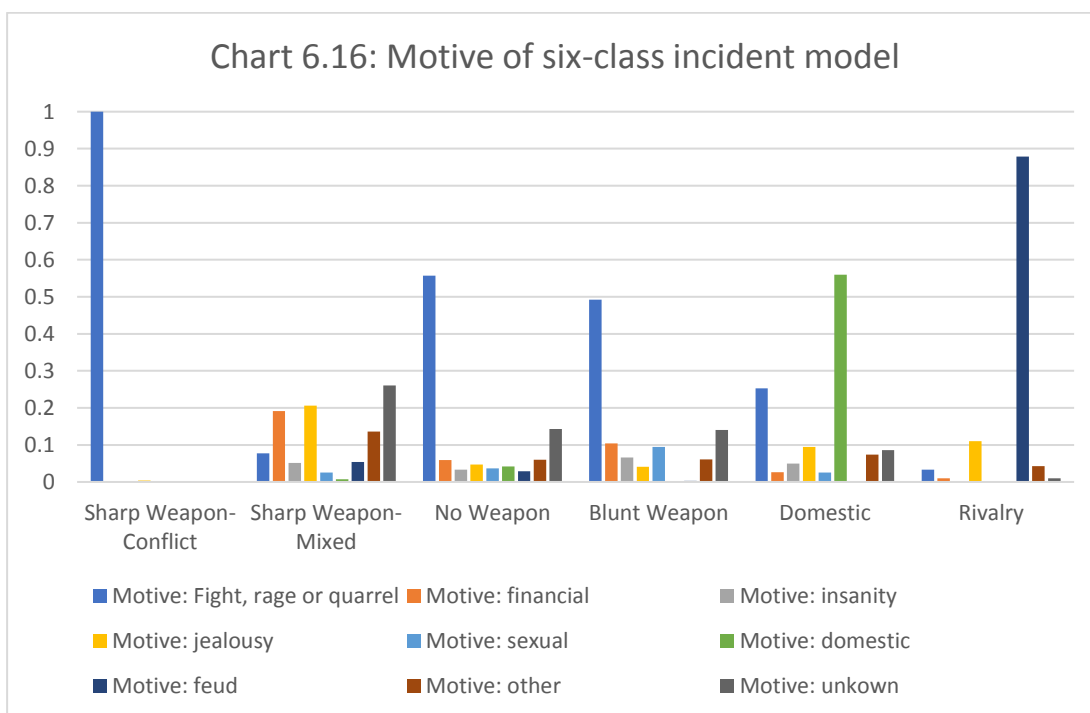
Class number	Class name	Number	Percent (%)
Class 1	Sharp Weapon-Conflict	640	28.8%
Class 2	Sharp Weapon-Mixed	355	16.0%
Class 3	No weapon	506	22.8%
Class 4	Blunt Weapon	398	17.9%
Class 5	Domestic	186	8.4%
Class 6	Rivalry	135	6.1%
Total:		2400	100%

Note 1: Source: SHD.

Note 2: Although the No Weapon class was larger than the Sharp Weapon-Mixed class, the Sharp Weapon-Mixed class was put above the No Weapon class in the table due to the stark similarities between the Sharp Weapon-Mixed class and the Sharp Weapon-Conflict class.



Note 1: Source: SHD. Base: n=2400



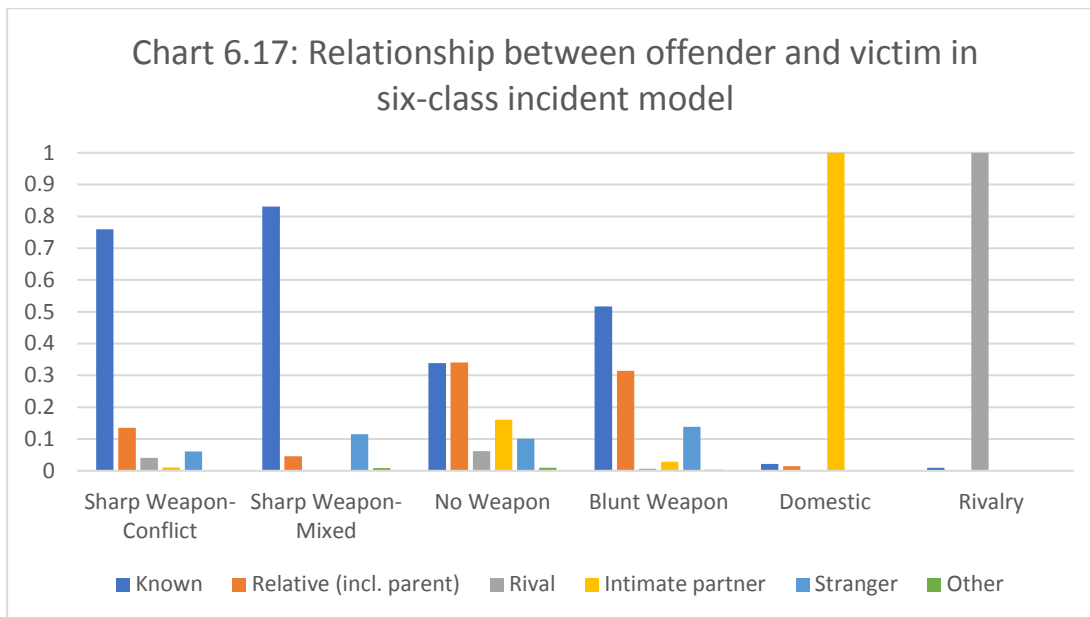
Note 1: Source: SHD. Base: n=2400

Class 2 (16.0%) was labelled Sharp Weapon-Mixed and was similar to the Sharp Weapon-Conflict class in that the most common method of killing was stabbing with the use of a sharp instrument (see chart 6.15). But unlike the Sharp Weapon-Conflict class, the motivation for this type of homicide was very mixed and varied (see chart

6.16). The most common motivation behind this homicide was unknown (26%), followed by jealousy (21%) and financial reasons (19%). Another 13% had 'other' motivations, including mercy killings and homicides motivated by organised crime. Similar to the Sharp Weapon-Conflict class, the most common relationship was associate or friend (see chart 6.17). Even though stabbing by a sharp weapon was the most common method of killing (73%), another fifth of the cases included victims who were shot to death by a firearm (see chart 6.15). In most of the cases the weapon was brought to the scene by the offender (see chart 6.18). Most cases occurred in a public place rather than a private one, but exactly as many cases were committed outside as inside (see charts 6.20-6.21). This could suggest that some of these cases were committed in a bar or a pub. Similar to other classes, the vast majority of the Sharp Weapon-Mixed Homicides were committed in an urban area (see chart 6.19). Overall, the Sharp Weapon-Mixed class involved friends or associates with the use of a sharp instrument, with a very varied range of motivation for the homicide.

Class 3 (22.8%) was labelled No Weapon since none of the killings in this class involved the use of a weapon⁷⁵. The most common method of killing was physical assault (65%) followed by strangulation or asphyxiation (16%) (see chart 6.15). The most common relationship between offenders and victims was a relative, most commonly a parent (34%) and a little more than a third was otherwise known to each other (such as friends or associates etc.). Another 16% of the cases included victims and offenders who were intimate partners (see chart 6.17). The most common motive for the No Weapon cases was some sort of fight or conflict (56%, see chart 6.16). The vast majority of the No Weapon homicides occurred in an urban setting, and most of the homicides also occurred indoors, in a private setting (see charts 6.19-6.21). Overall, this type of homicide would indicate homicides occurring without the use of a weapon between relatives or people who are otherwise known to each other, motivated by some sort of conflict.

⁷⁵ Technically, this should be 'all of the cases included a victim who were not killed by the use of a weapon'; since any case can include multiple victims, there might be cases with victims who were killed with the use of a weapon, although all cases included at least one victim that was not.

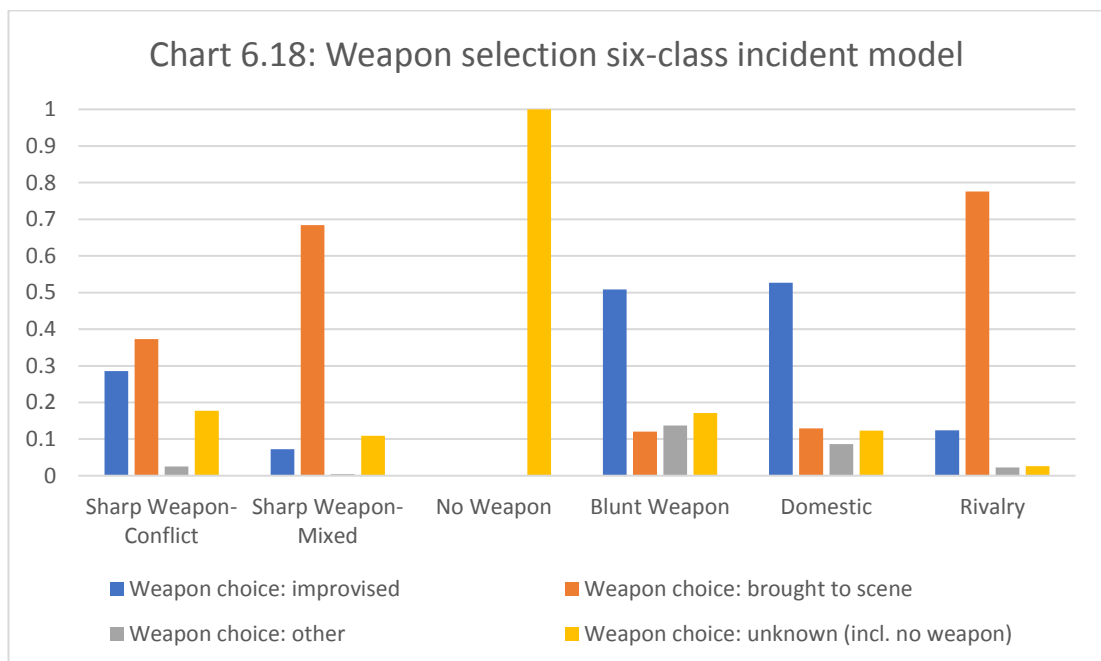


Note 1: Source: SHD. Base: n=2400

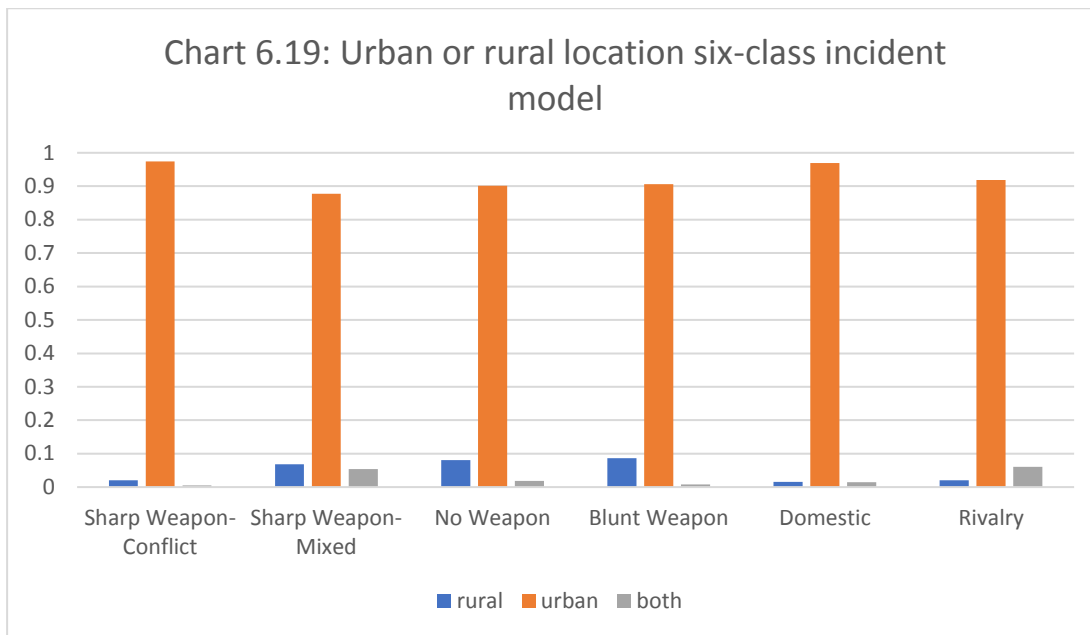
Class 4 (17.9%) was labelled Blunt Weapon and was very similar to the No Weapon class except for the differences in weapons. A blunt instrument was the most common method of killing (60%), while a quarter of the cases included a strangled or asphyxiated victim, a third of cases included victims who were assaulted to death and in approximately 40% of all the cases some other method of killing was used (chart 6.15). Most of the weapons were improvised at the time of murder (see chart 6.18). The most common type of relationship was known or associate, but another 31% of all the offenders were related to the victim in some way (see chart 6.17). The most common motive was Fight, rage or quarrel with almost half of the cases having this motivation (see chart 6.16). Another 10% was financially motivated (including theft) and in about 14% of the cases, the motivation was unknown. Similar to the No Weapon class, most of the Blunt Weapon homicides occurred indoors, in an urban area, in a private setting (see charts 6.19-6.21). Overall, this class would indicate a type of homicide committed with the use of a blunt instrument by people known to each other, sometimes family members, in the context of some sort of fight or conflict, in an indoor private setting.

Class 5 (8.4%) was labelled Domestic since all of these homicides were committed by intimate partners and most (56%) of these cases were motivated by a domestic dispute (see charts 6.16-6.17). Another quarter of the Domestic cases was motivated by some

sort of fight or conflict. The most common method of killing in the Domestic homicides was stabbing by a sharp instrument (77%) followed by the use of a blunt instrument (14%) (see chart 6.15). One in ten cases also included a victim who was strangled or asphyxiated to death. Similar to the Blunt Weapon homicides, the choice of weapon was most commonly improvised by the offenders at the scene (see chart 6.18). The vast majority of the Domestic homicides occurred indoors in a private setting in an urban area (see charts 6.19-6.21). Overall, this would indicate a type of homicide between intimate partners in an indoor, private setting, motivated by some sort of domestic dispute, most commonly with the use of a sharp instrument.

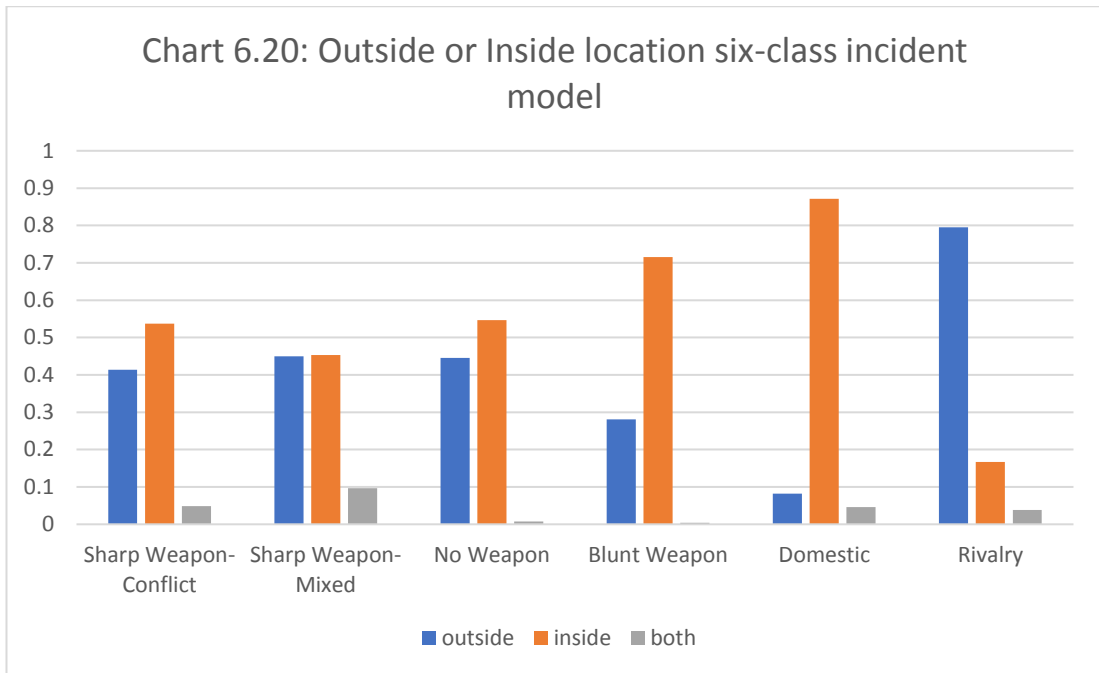


Note 1: Source: SHD. Base: n=2400

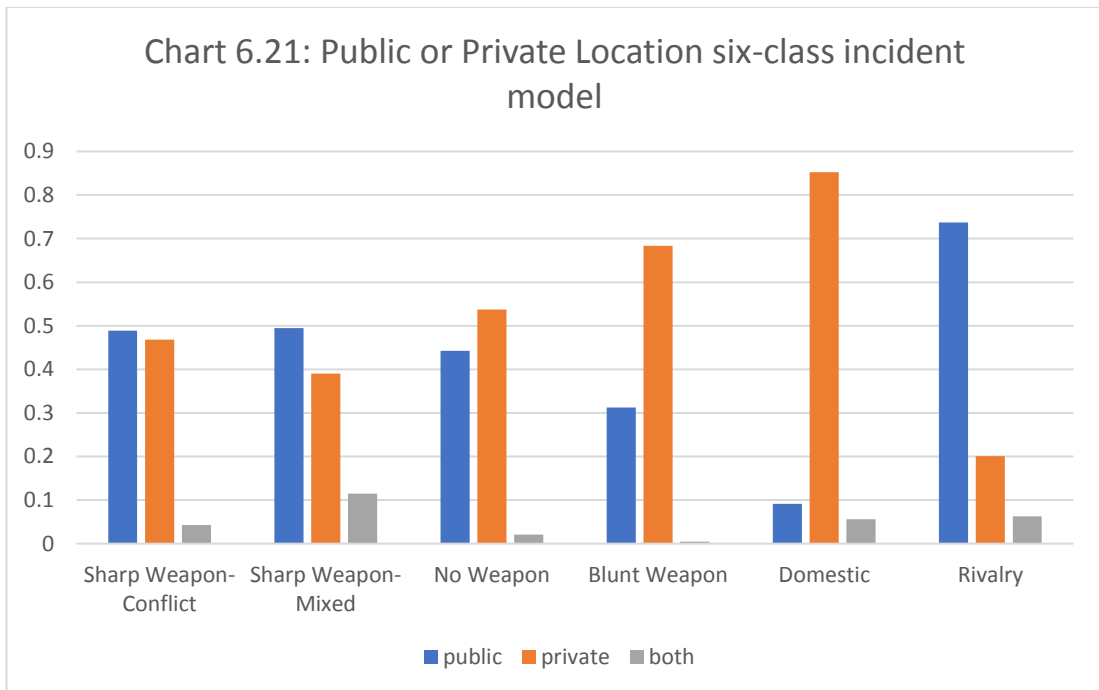


Note 1: Source: SHD. Base: n=2400

The sixth and smallest class (6.1%) was called Rivalry homicides since all the offenders and victims were rivals in this class (see chart 6.17). The most common motive of the Rivalry class was feud or faction rivalry (88%), with one in ten being motivated by jealousy or revenge (see chart 6.16). The most common method of killing was stabbing with a sharp weapon (65%) followed by shooting with a firearm (23%) (see chart 6.15). The majority of the cases (78%) included an offender who brought the weapon to the scene (see chart 6.18). The vast majority of the Rivalry homicides were committed in an urban area (92%), the majority of cases were committed outside (76%) and most cases were committed in a public setting (74%) (see charts 6.19-6.21). Overall, the Rivalry homicides appear to be a type of homicide characterised by a long-standing feud or fight between rivals, killing each other in an outdoor public place with a sharp weapon or, less commonly, a firearm. Out of all the classes, this was also the smallest class (6.1% of all the cases).



Note 1: Source: SHD. Base: n=2400



Note 1: Source: SHD. Base: n=2400

6.4.4 Conclusions of incident typology

When the LCA models of the incident variables were examined it became clear that the six-class model was the best fitting model for the data. This was the model with the best fit statistics as well as the most substantively meaningful model. The best fitting model included six classes named: Sharp Weapon-Conflict; Sharp Weapon-

Mixed; No Weapon; Blunt Weapon; Domestic; and Rivalry. The largest class was Sharp Weapon-Conflict, which constituted little more than a quarter of all homicide cases. The characteristics of the Sharp Weapon-Conflict homicides also bear very strong resemblance to the most common features of all homicides before the data was submitted to LCA modelling. The most common method of killing was by a sharp instrument, most offenders and victims were associate or friends, and the most common motive was fight, rage or quarrel. It could therefore be suggested that the Sharp Weapon-Conflict homicides are the 'archetype' or most common homicide in Scotland over time. The Sharp Weapon-Conflict type also bears strong resemblance to many other types of homicide described in previous research, such as the 'Conflict Resolution' homicides described by Polk (1994), where most offenders and victims are known to each other and the homicide occurs because of some sort of conflict. The Sharp Weapon-Conflict also bears some resemblance to the Dispute Homicides identified by Pizarro (2008) and the Dispute-Acquaintances homicides identified by Smit et al., (2000).

The Domestic homicide type identified in the current study has been widely replicated in previous studies. Similar subtypes can for instance be seen in the studies by Pizarro (2008), Polk (1994), Wood Harper and Voigt (2007), Thomas et al. (2011) and Morton et al. (1998). This would suggest that the Domestic type identified in the current study is a well-documented type of homicide.

By submitting the data to LCA modelling however, this study found other types of homicide that have not been identified in other studies. This validates the use of this analysis, since the five types of homicide identified here other than the 'archetype' (Sharp Weapon-Conflict) would not have been discovered otherwise. The six classes differ distinctly from one another and there is therefore important to examine whether these six classes will demonstrate differences in how they have changed over time. Although all homicide has decreased over the examined time period, all of these types may not have decreased equally, or some might even have increased over time.

When examining the classes in the six-class model it became apparent that the variable Rural/urban did not disaggregate among the classes. All classes occurred mostly in urban areas. This variable was therefore excluded from the two-level LCA model.

An issue that stands out in all of the three models is the problem with missingness. Some of the substantively relevant variables had more than 60% missing, meaning that the results involving these variables might be skewed. Although the missing data is argued to be MAR in the current thesis (see Chapter 4, section 4.3.8) the missingness could still constitute a problem since any potential change over time in these variables might just reflect the decreased missingness in the data rather than constituting an actual change. However, when the single-level models were run on the 16-year dataset (2000-2015) which had much lower levels of missingness, the models were virtually indistinguishable from the 26-year dataset (1990-2015), suggesting that the missingness did not substantially affect the single-level models (see Appendices 6.3, 6.6 and 6.8). As will be discussed in the next Chapter however, the missingness did seem to have an effect on the two-level modelling and it was therefore decided to exclude the first ten years of the dataset from all subsequent modelling. The results presented in this chapter were therefore the only models based on the entire 26-year period (1990-2015).

6.5 Chapter Conclusions

This chapter has presented the initial results of the thesis, examining three different sets of variables of which a homicide case arguably consists: variables about the victim, the offender and the incident itself. To this end, three different datasets were created and these three datasets were analysed separately. Descriptive data about the variables in each dataset were initially presented, before the change in these variables was examined over time. The single-level LCA models of each set of variables were subsequently presented, resulting in a four-class victim model, a five-class offender model and a six-class incident model.

Although these three models were interesting in their own right, the purpose of identifying them was to get an indication of the most appropriate number of classes in

each model, as well as help guide what classifying variables to include in the two-level model, before identifying a multilevel LCA model including all of these variables. For instance, although whether or not the homicide took place in an urban or rural area might be interesting from a substantive point of view, this variable failed to disaggregate among any of the classes in the incident model and will therefore be excluded in the multilevel model for model parsimony. Similarly, recorded home address failed to disaggregate among the offender classes, however when this variable was removed the model worsened significantly and it was therefore decided to keep this variable in the model.

Overall, this Chapter argued that there were strong similarities between the victim and offender classes identified in this chapter. Some of the classes (such as the Stable Male victim class and the Non-white Male offender type, and both Female classes) were almost identical across the two datasets. Since this indicated strong similarities between the victims and offenders of homicide, the next step was to examine the interaction of these subtypes within the same cases of homicide (see Chapter 7). This would for instance reveal whether these similar classes identified in the two datasets commonly coincide in a homicide case, or whether there were certain combinations of offender-victim types that were more common than others. Similarly, it was important to examine how the different incident classes interacted with the classes of victims and offenders. This chapter has provided information regarding what the three different parts of a homicide case look like, but not how they interact. This chapter has provided a deeper understanding for the characteristics and patterns of victims, offenders and incidents of homicide over time in Scotland, which holds theoretical relevance, but has limited relevance for policy or practice since these three parts of a homicide case are rarely examined in isolation. In order to truly understand homicide in Scotland, these three parts need to be examined together. The next chapter will therefore model these three aspects simultaneously in order to be able to identify a multilevel model of homicide cases including victim, offender and incident-level variables.

Chapter 7: Multilevel LCA of the Homicide data

7.1 Introduction

The previous chapter examined the single-level models of homicide involving the victims, offenders and incident-level variables. The results from the previous chapter identified a victim model of four types, an offender model of five types and an incident model of six types of homicide as the best fitting models. It was also found that the variable rural or urban location failed to disaggregate among the classes, and was therefore excluded from the model. The analysis of the previous Chapter therefore helped identify the most relevant variables for the identification of subtypes of victims, offenders and incidents respectively, as well as helped determine what variables to include in the two-level model. The analysis of the previous Chapter also provided an indication of the most appropriate number of classes to include in the two-level model. This chapter will therefore build on the previous one by examining all three of these elements simultaneously in a multilevel model of homicide cases including victim, offender and incident-level variables, thereby providing the answer to the first research question; What subtypes of homicide with similar characteristics can be identified? The Offender-based two-level dataset will be used for this analysis (see Chapter 4, section 4.3.8). This will allow for examination of all three aspects of homicide as well as an examination of how the identified homicide types have changed over time, which will be analysed in Chapter 9.

As outlined in Chapter 4, it will be argued that the first ten years of the dataset (1990-1999) significantly skewed the patterns in the data due to the high levels of missingness in these years and it was preferable, therefore, to exclude them from the two-level modelling. It will be argued that the best fitting solution is a 4-3 model, with four between classes of homicide (*Stabbing; No Weapon-Bludgeoning; Rivalry* and *Femicide*) and three within classes of offenders (*Young Unemployed Offenders; Mixed Unemployed Offenders; and Employed Offenders*), resulting in a total of twelve different homicide subtypes. When the best fitting model of the 16-year dataset was compared to the equivalent model of the 26-year dataset, the 16-year model was found to have superior fit and was therefore used. It will be argued that the typology of

homicide identified in the current study can be considered more universal and distinct compared to previous typologies due to the wide range of variables and characteristics used to identify the types of homicide in the current study, which forms part of the original contribution of the current study.

The following section will describe the two-level modelling of the 16-year homicide dataset.

7.2 Two-level LCA of homicide data

As discussed in Chapter 4, the 26-year homicide dataset, spanning from 1990-2015, included high level of missingness in the earlier years of the data. Although the Multilevel LCA models can accommodate moderate amounts of missing data, very high levels of missingness are problematic since the model can only estimate the missing values based on the non-missing values. If a variable for instance has more than 70% missing, this means that the remaining 30% will be used to estimate all findings, even if the missing data is Missing at Random (MAR). This can lead to poor model fit and misinterpretation of the data as well as decreased overall validity of the results. To avoid this problem, it was therefore decided to exclude the first ten years of the data (see Chapter 4) and only use the 16-year dataset spanning from 2000-2015 when running the two-level model.

Chapter 6 described the single-level models of homicide, modelling the victim, offender and incident-level variables separately. This provided valuable information about the homicide data that helped to guide the two-level model described in this Chapter. For instance, it was found that the variable measuring whether the incident took place in a rural or urban setting failed to disaggregate between any of the classes, and this variable was therefore excluded from the two-level modelling (see Chapter 6). The substantive interpretation as well as the number of classes in each single-level model also helped to inform the two-level model.

Although the 16-year dataset substantially reduced missingness in the data compared to the 26-year dataset, a cut-off point of 60% missing was introduced in order to

increase the validity of the model. This meant that any variable that had more than 60%⁷⁶ missing was excluded. As can be seen from table 7.1, only one classifying variable did not pass this threshold: influence status of the offender. This variable was therefore excluded from any further analysis along with rural or urban location.

Table 7.1: Classifying variables of the 16-year dataset

Victim variables (% missing)	Offender variables (% missing)	Incident variables (% missing)
Age at time of crime (0.0%)	Age at time of crime (0.6%)	Method of Killing (0.0%)
Gender (0.0%)	Gender (0.0%)	Relationship between offender and victim (39.4%)
Employment status (47.8%)	Employment status (46.1%)	Motive (11.8%)
Ethnicity (0.0%)	Ethnicity (0.8%)	Public or private location (39.1%)
Influenced by alcohol or drugs (55.7%)	<i>Influenced by alcohol or drugs (72.9%)</i>	Inside or outside location (33.8%)
Residential status (25.0%)	Residential status (29.0%)	Weapon selection (47.8%)
	Suicide of the offender (0.0%)	

Note 1: Source: SHD. Base: n=1978.

Note 2: Percentage missing was calculated based on the number of homicide offenders.

Note 3: Offender influence status is in italics since this variable was excluded from the modelling due to high missingness.

In addition to the classifying variables set out in table 7.1, three binary covariates measuring periods of time (between 2000-2015) were included in the two-level LCA model (see table 7.2). Each covariate measured a four-year period and the first year group (2000-2003) was the reference category. This meant that the change in the different homicide types could be compared to each other over time, using 2000-2003 as a comparison point. Different year groups were created for the 16-year dataset compared to the 26-year dataset in order to have more timepoints for comparison.

⁷⁶ 60% was decided since this was considered to constitute the majority.

As described in Chapter 4 and Chapter 5, this modelling was done on the Offender-based two-level dataset, meaning that the within-level of the homicide model consisted of the offender variables, and the between-level consisted of the victim and incident variables. The two-level LCA modelling was conducted on all cases, including the missing data. For more information on the exact parameters of the modelling, see Chapter 5, section 5.3.1. See Appendix 7.1 for full Mplus syntax. The next section will describe the two-level modelling process.

Table 7.2: Year groups as covariates

Year	N	Valid percent
2000-2003	527	26.6%
2004-2007	626	31.6%
2008-2011	518	26.2%
2012-2015	307	15.6%
Total:	1978	100%

Note 1: Source: SHD. Base: n=1978

Note 2: The missingness is 0% in these variables.

7.2.1 Deciding on the number of classes

As with the single-level models, the number of classes had to be specified by the researcher when running a two-level model. There are a few different alternatives for this process when conducting multilevel modelling, but as discussed in Chapter 5, different combinations of between (victim and incident) and within (offender) classes for up to four classes on each level (4-4) were examined for both homicide and violence in this study, similarly to Bijmolt, Pass & Vermunt (2004), starting with a 1-2 model⁷⁷ (see table 7.3). The 1-2 and 2-1 models will be included in the table for comparison in order to ensure that none of these models have the best fit statistics (AIC, BIC and ABIC) since this would suggest that a model without any subtypes on either level explained the data most appropriately. If these models do not have the best fit statistics they will not be explored any further due to the simplistic nature of the

⁷⁷ A 1-1 model could not be run with the two-level syntax because the software encourages a simpler solution when there is only one class on each level.

models. All the models were run with the year groups as covariates in order to examine how the classes had changed over time. This analysis will be described in Chapter 9. As with the single-level models, four statistical measures of fit were evaluated alongside the entropy value; AIC, BIC, percentage change in BIC, and ABIC. The best models were then compared in order to find the model of highest substantive interest.

As can be seen from table 7.3, priority was given to the between types (incidents and victims) when comparing the models. This was because the study is primarily focused on the classification of incidents of homicide rather than offenders. The between types were therefore of primary interest and as mentioned in Chapter 5, section 5.3.3, the between-level classes will be referred to as ‘types’ while the within-level classes of the homicide model will be referred to as ‘classes’. ‘Subtypes’ of homicide will refer to the combination of types and classes, such as the *Employed Offender Rivalry* subtype. As can be seen from table 7.3, the two best models appear to be the 4-3 model, which had the best BIC and ABIC, and the 4-4 model, which had the best AIC.

Although the 2-2 model demonstrated the best entropy value beyond the 1-2 and 2-1 models, this model was not substantively meaningful due to the low number of classes (see Appendix 7.2). As with the single-level models, this was considered too simplistic and the 2-2 model was therefore excluded. When the 4-3 model was compared to the 4-4 model (see appendix 7.3) it was found that the additional offender class of the 4-4 model did not help distinguish between the classes. The additional class created in this model appeared to separate the female offenders which, although interesting, meant that all other traits were very similar across the four classes. The 4-3 model appeared more distinct as well as substantively interesting, so it was selected as the best fitting homicide model.

Table 7.3: Class selection statistics of two-level LCA Homicide model (16-year dataset)

No. of classes (between-within)	Loglikelihood value	AIC	BIC	Percentage change in BIC	ABIC	Entropy
1-2	-24148.83	48445.67	48859.31	N/A	48624.21	0.491
2-1	-20936.46	42088.92	42692.62	-12.62	42349.50	0.915
2-2	-20786.64	41813.30	42484.10	-0.49	42102.80	0.907
2-3	-20178.95	40701.91	41663.36	-1.93	41116.91	0.899
2-4	-20740.42	41768.84	42573.77	2.19	42116.28	0.777
3-2	-20178.95	40701.91	41663.36	-2.14	41116.91	0.899
3-3	-20145.39	40660.78	41694.90	0.08	41107.14	0.853
3-4	-20127.48	40650.95	41757.74	0.15	41128.69	0.818
4-2	-19712.34	39872.69	41124.81	-1.52	40413.16	0.837
4-3	-19650.39	39776.80	41107.20	-0.04	40351.02	0.763
4-4	-19623.95	39751.90	41160.50	0.13	40359.90	0.75

Note 1: Source: SHD. Base: n=1978

The next section will compare this 4-3 model of the 16-year dataset to the 4-3 model of the 26-year dataset in order to determine which model demonstrates the best model fit.

7.2.2 16-year dataset compared to 26-year dataset

As discussed in Chapter 4, section 4.3.8, the first ten years (1990-1999) of the dataset was excluded due to high levels of missingness. It was however decided to compare the best fitting model (the 4-3 model) of the 16-year dataset (2000-2015) to the equivalent model of the 26-year dataset (1990-2015). This was done for two main reasons: firstly, to examine whether the 16-year dataset proved a better fit to the data when comparing the fit statistics. If the 4-3 model in the 26-year dataset proved to have

better fit statistics than the 3-4 model in the 16-year dataset, this would mean that the 26-year model explained the data better, despite the high levels of missingness in the first ten years of data. This, in turn, would mean that the 26-year model might be chosen as the best fitting homicide model. Secondly, this was done to examine the substantive interpretation of the classes in both models. If the classes were substantively similar, this would mean that the results of the 16-year model could reasonably be extrapolated to the whole 26-year period, however, if the classes were very different, this would not be the case. As can be seen from table 7.4, the AIC, BIC and ABIC were all better for the 4-3 model of the 16-year dataset, but the entropy was slightly better for the 26-year dataset. Important to note however is that the best loglikelihood value for the 26-year dataset failed to replicate, even with more than a 400% increase in random starts compared to the first model run.

Table 7.4: Comparison of class selection statistics for 26-year model and 16-year model

Number of classes (between-within)	Loglikelihood value	AIC	BIC	ABIC	Entropy
16-year dataset (4-3)	-19650	39776.8	41107.2	40351	0.763
26-year dataset (4-3)	-30717	61916.6	63400.2	62634.4	0.789

Note 1: Source: SHD.

Note 2: Percentage change in BIC was not included here since the comparison was only between these two models from different datasets. The percentage change in BIC was therefore of less interest in this comparison.

As mentioned, the substantive interpretation of the models was also compared in order to examine if the classes in the 16-year dataset were similar to the classes in the 26-year dataset. To save space the 26-year model is reported in appendix 7.3; however, both the between types and within classes of the 4-3 model for the 26-year dataset were similar to the classes of the 16-year dataset (see section 7.2.3-7.2.4), although the classes in the 26-year dataset were less distinctive. For instance, class 1, class 3 and class 4 were virtually indistinguishable in the 26-year dataset (see appendix 7.3). The only real difference between these classes appears to be location in regards to class 1 and victim age. Compared to the 4-3 model of the 16-year dataset (see section 7.3),

the 4-3 model of the 26-year dataset appears considerably worse. This, in combination with the superior fit statistics of the 16-year model led the decision to only use the 16-year dataset for the two-level homicide model. Since the classes were quite different, although there were similar traits, it was also decided that any results from the homicide modelling should only be extended to the 16-year period (2000-2015). No conclusions about the 1990-1999 period will therefore be drawn.

The following section will provide a description of the four between classes of the homicide model in the 16-year dataset.

7.2.3 Between (Incident and victim) types

As mentioned, the best fitting model of homicide was a 4-3 model, meaning that there were four types of homicide based on a combination of the characteristics of the incident and the victim and, within these types, there were three classes of offenders. As with the single-level models, the within and between classes of the two-level model were named after the most distinguishing traits (see Chapter 5).

Table 7.5: Between (victim and incident) types

Type number	Class name	Number	Percent (%)
Type 1	Stabbing	630	31.9%
Type 2	No Weapon-Bludgeoning	540	27.3%
Type 3	Rivalry	492	24.8%
Type 4	Femicide	316	16.0%
Total:		1978	100%

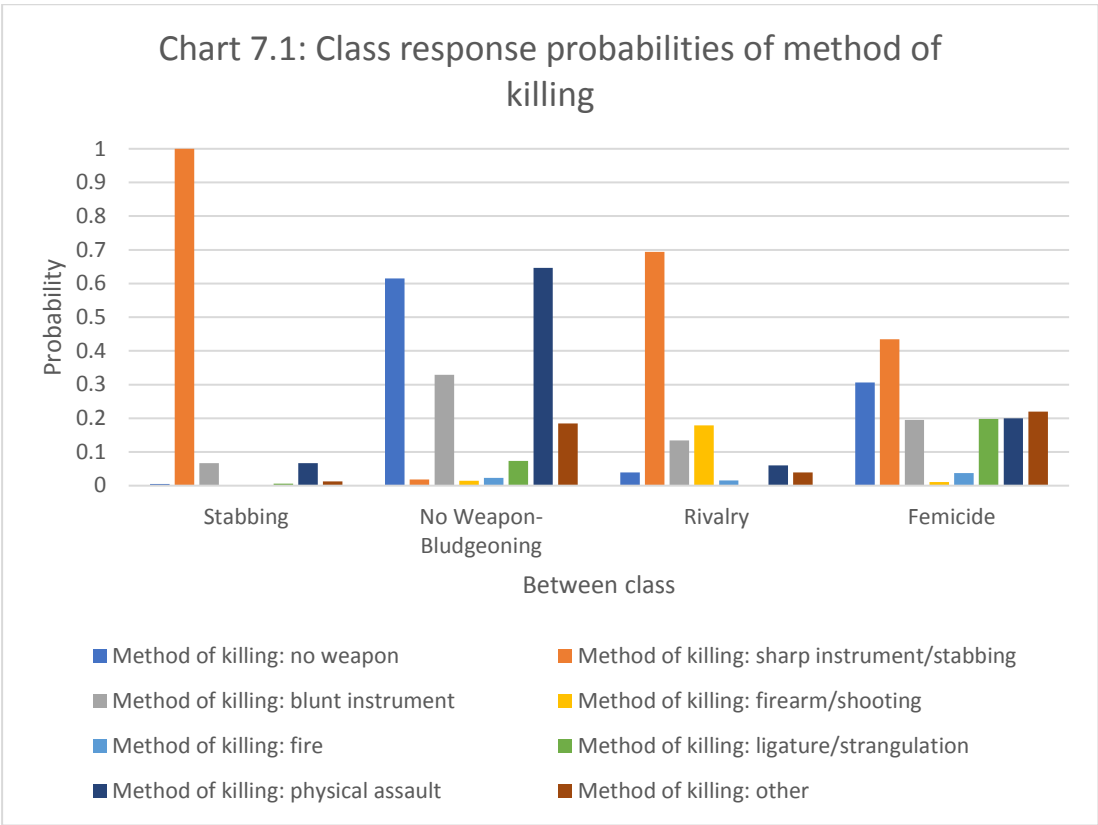
Note 1: Source: SHD. Base: n=1978

When the four between types of the 4-3 model were examined, it was revealed that the model had identified four medium sized types (see table 7.5). Due to the high number of classifying variables, the classes will be presented in groups of classifying variables for clarity. As discussed in Chapter 5, although the types will be described in almost deterministic terms, the types are all based on probability. This means that although a

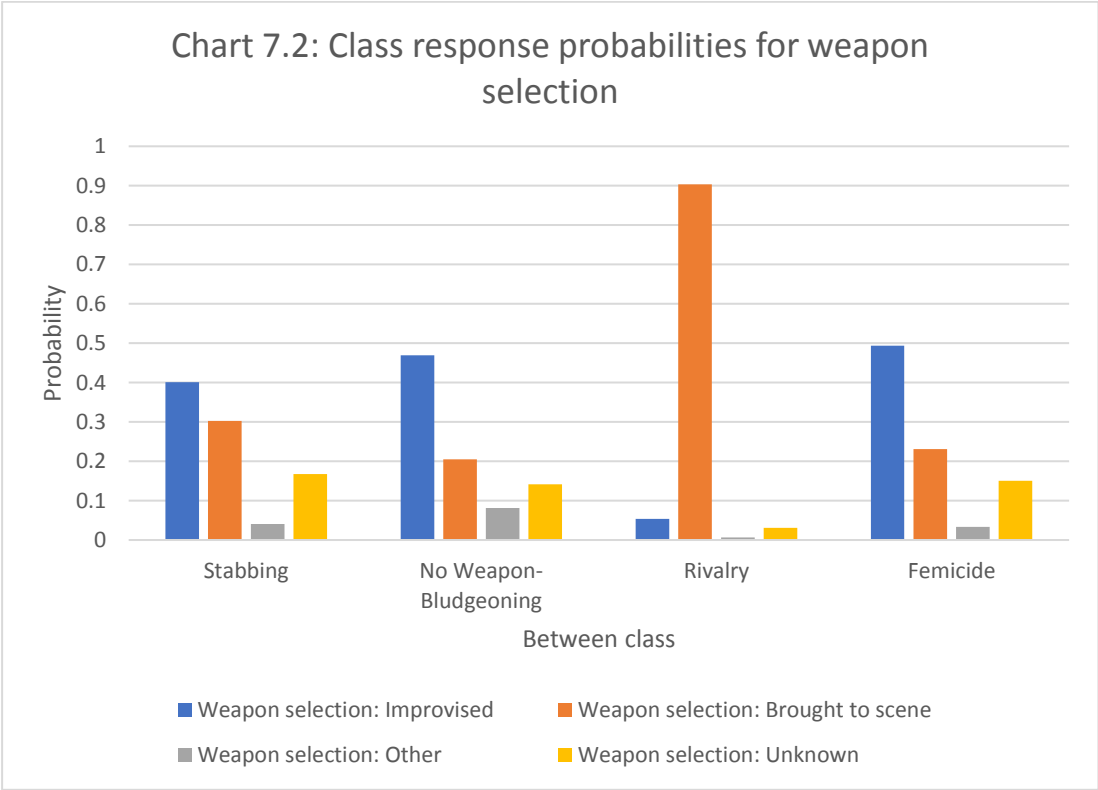
type may consist of 80% stabbings and will therefore be described as a ‘Stabbing’ type, 20% of the cases were not killed by stabbing. Similarly, any one person has varying probability of belonging to every type. For sake of clarity and space however, the use of language has been somewhat simplified.

7.2.3.1 Stabbing type

The first and largest type, labelled the *Stabbing* type (31.9%, n=630), consisted only of homicides committed with the use of a sharp weapon (see chart 7.1). Most of these weapons were not brought to the scene but were improvised by the offender (see chart 7.2). The vast majority of the offenders and victims were friends, acquaintances or by some means known to each other (see chart 7.3) and the most common motive for the *Stabbing* homicides were some sort of fight or argument (see chart 7.4). Most of the *Stabbing* homicides occurred in a private location inside (see charts 7.5-7.6). When the victim characteristics of the *Stabbing* homicides were examined, it can be seen that most of the victims were male, under the influence of either drugs or alcohol at the time of murder and unemployed (see charts 7.7-7.8). The majority of victims were of white ethnicity and had a recorded home address. The most common age of the victims of the *Stabbing* type was 31-45 years old (41%), while approximately a third being 16-30 years old (see chart 7.9).

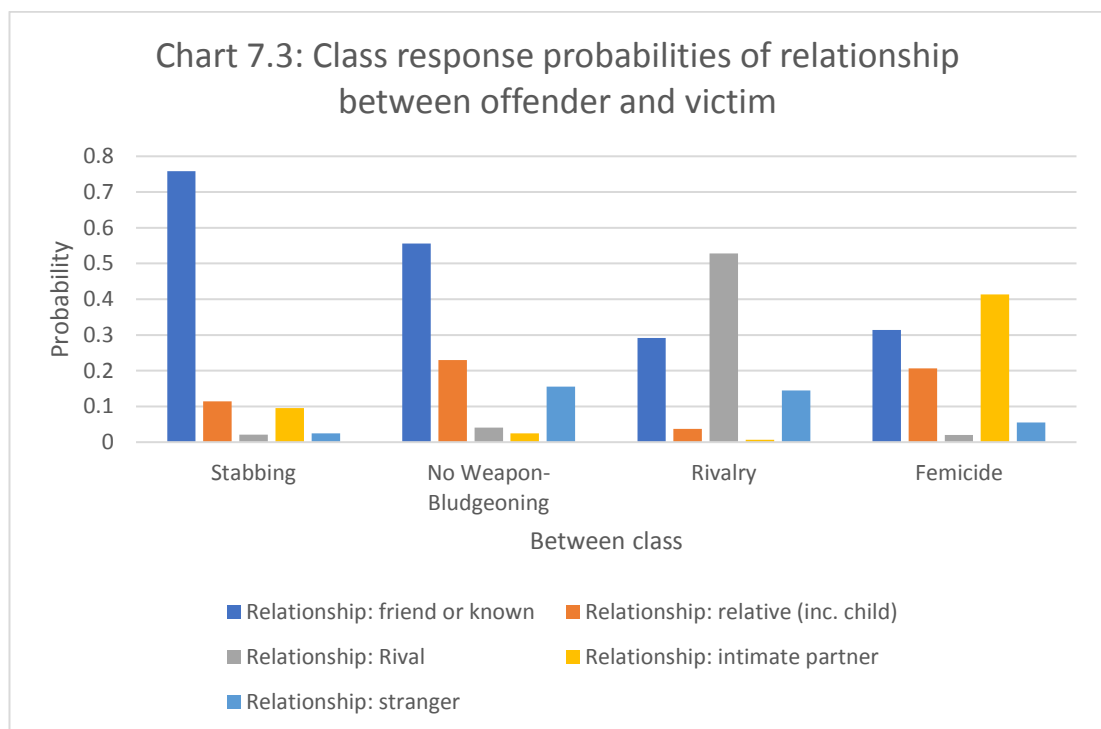


Note 1: Source: SHD. Base: n=1978



Note 1: Source: SHD. Base: n=1978

Overall, this would indicate a type of homicide involving the use of sharp weapons committed against relatively young men inside a private location. The victims tended to be under the influence of alcohol or drugs and the homicide occurred in the context of some sort of fight or argument between the offender and victim. Additionally, most of the victims were unemployed, which could indicate a higher level of deprivation among the victims of this type of homicide. The fact that the choice of weapon was commonly not brought to the scene, but improvised could also indicate that the *Stabbing* homicides were mostly unplanned and spur-of-the-moment in nature. Additionally, this type was quite similar to the Sharp Weapon-Conflict and Sharp Weapon-Mixed classes in the single-level incident model (see Chapter 6).



Note 1: Source: SHD. Base: n=1978

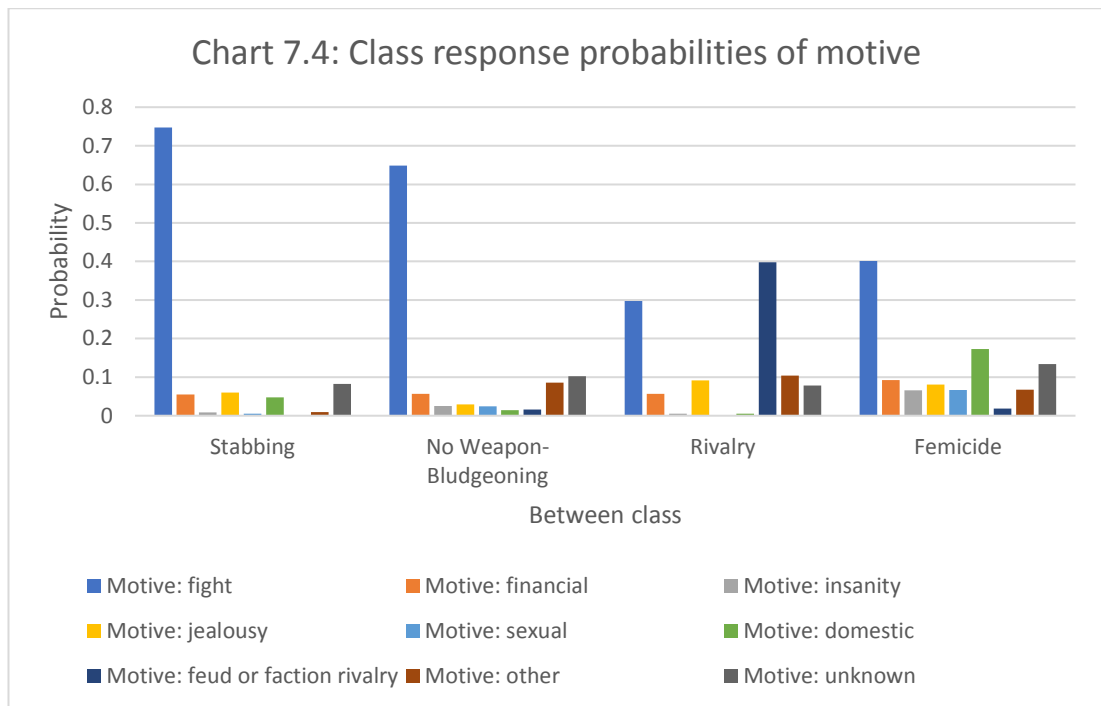
7.2.3.2 No Weapon-Bludgeoning type

The second between-level type was labelled the *No Weapon-Bludgeoning* type (27.3%, n=540) since the most common method of killing was by physical assault, and in three fifths of the cases no weapon was used at all (see chart 7.1). In about a third of the cases a blunt instrument was used. In the cases where a weapon was used, most of the weapons were improvised at the scene (see chart 7.2). Overall, the *No Weapon-Bludgeoning* type was very similar to the *Stabbing* type except for the method of

killing. The most common motive was some sort of fight or quarrel (see chart 7.4) and most of the cases were committed in a private, indoor location (see charts 7.5-7.6). The most common relationship between the offender and victim for the *No Weapon-Bludgeoning* type was someone known, like a friend or associate, although around a quarter of cases involved relatives (see chart 7.3). Around 15.5% of the *No Weapon-Bludgeoning* cases were committed between strangers, which was higher than for the *Stabbing* type.

When the victim characteristics of the *No Weapon-Bludgeoning* type were examined, it was revealed that most of the victims were male, under the influence of drugs or alcohol and unemployed, similarly to the victims of the *Stabbing* type (see charts 7.7-7.8). The victims of the *No Weapon-Bludgeoning* type however tended to be older than the *Stabbing* victims; the most common age of the *No Weapon-Bludgeoning* type was 46-60 years old, with almost as many victims being 31-45 years old (see chart 7.9).

Overall, this would indicate a type of homicide which took place in private settings indoors where the victim died as a result of physical assault or bludgeoning, mostly without the use of a weapon. The victims were often under the influence of drugs or alcohol and tended to be slightly older than the victims in the *Stabbing* type. The offender and victim most commonly knew each other, and in a quarter of the cases they were related. The motive behind this type of homicide was typically some sort of conflict or fight. This type was also quite similar to both the No Weapon class and the Blunt Weapon class of the single-level incident model (see Chapter 6).



Note 1: Source: SHD. Base: n=1978

7.2.3.3 Rivalry type

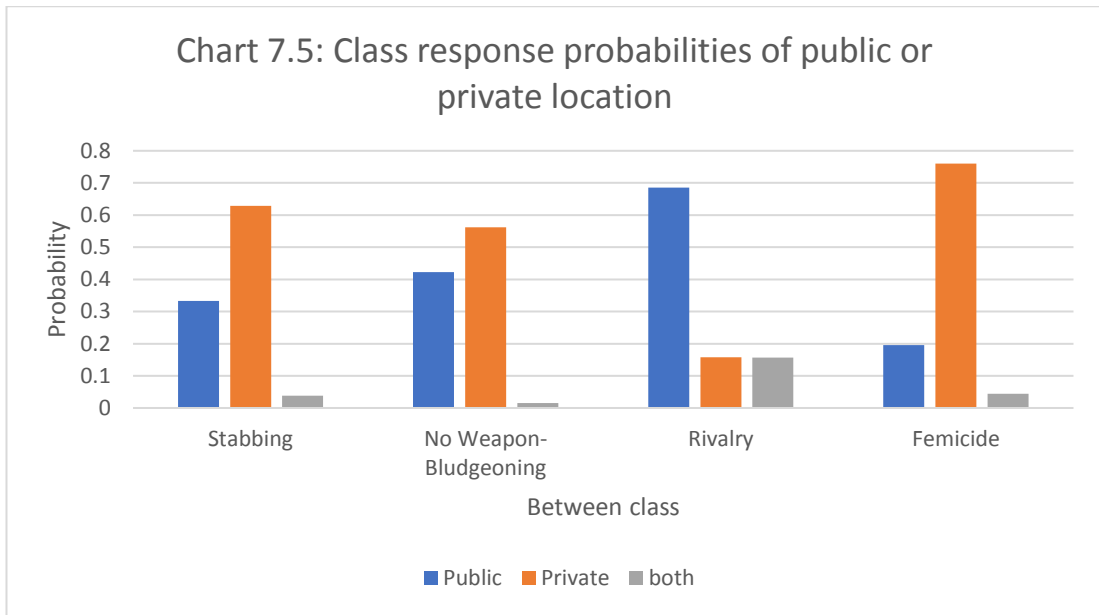
The third between-level type was named the *Rivalry* type (24.8%, n=492) because the most common relationship between the offender and victim was rival (see chart 7.3) and the most common motive was feud or faction rivalry (see chart 7.4). The most common method of killing in the *Rivalry* homicides was stabbing by a sharp instrument, although 17.9% of cases involved shooting as cause of death, which was the highest of all the types, (see chart 7.1), and the offenders most commonly brought the weapon to the scene of the murder (see chart 7.2). The *Rivalry* type was also the only type in which the majority of the homicides took place in a public location outside (see charts 7.5-7.6). The victims were most commonly male, white and unemployed, and although most victims were under the influence of drugs or alcohol at the time of murder, a high proportion of the victims were not (see charts 7.7-7.8). The majority of the victims were aged 16-30 years old, making the *Rivalry* homicide the type with the youngest victims overall.

Overall, this would suggest a type of homicide committed outdoors in public areas between young men who are enemies or rivals. The homicide was most commonly motivated by an ongoing feud and most of the victims were under the influence of

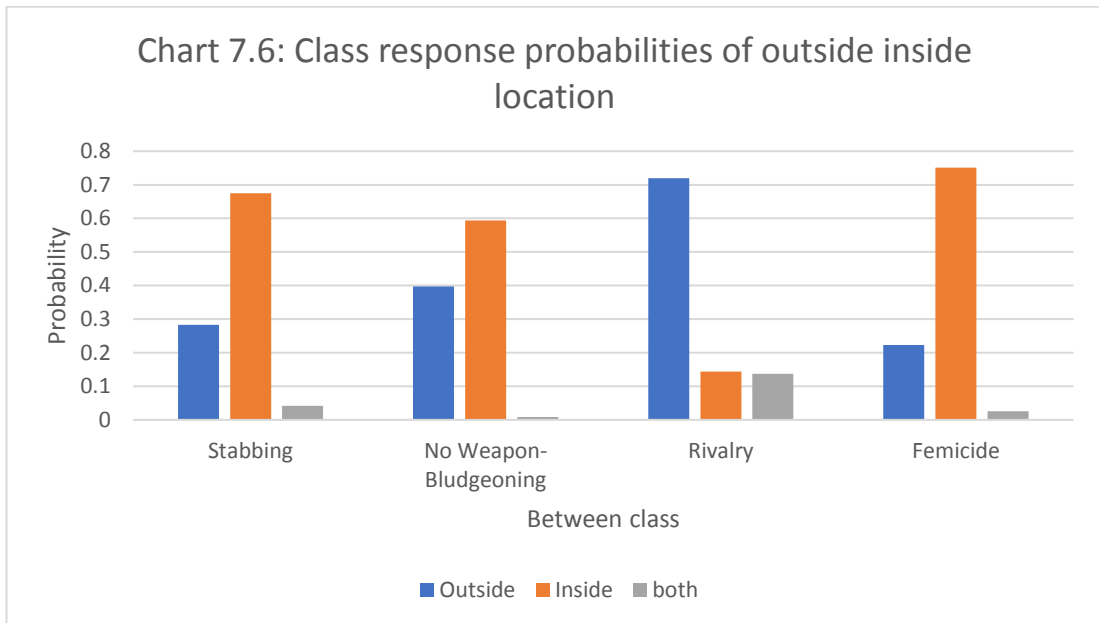
drugs or alcohol when they were killed. The most common method of killing was stabbing, but almost a fifth of the cases included shooting by a firearm. Most of the offenders had brought the weapon to the scene, which indicates some level of premeditation. This type was very similar to the Rivalry class identified in the single-level incident model (see Chapter 6).

7.2.3.4 Femicide type

The fourth and smallest of the between-level types was labelled the *Femicide* Class (16.0%, n=316) since all of the victims of this homicide type were female (see chart 7.7). The method of killing in this type was quite diverse compared to the other types, although stabbing was the most common method (see chart 7.1). About 30% were killed without the use of a weapon and a fifth was killed by strangulation or by the use of a ligature, which was the highest level of this method of killing compared to all the other types. In the cases where a weapon was used, this weapon was most commonly improvised at the scene (see chart 7.2). The victim and offender were most commonly intimate partners (41.4%), and a fifth being other relatives, including children of the offender (see chart 7.3). Although the most common motive was some sort of fight or conflict, another 17.3% of the *Femicides* were motivated by a domestic dispute and 6.6% of the cases were sexually motivated, which was the highest percentage of all the types (see chart 7.4). The majority of homicides in the *Femicide* type took place in private, indoor settings (see charts 7.5-7.6).



Note 1: Source: SHD. Base: n=1978

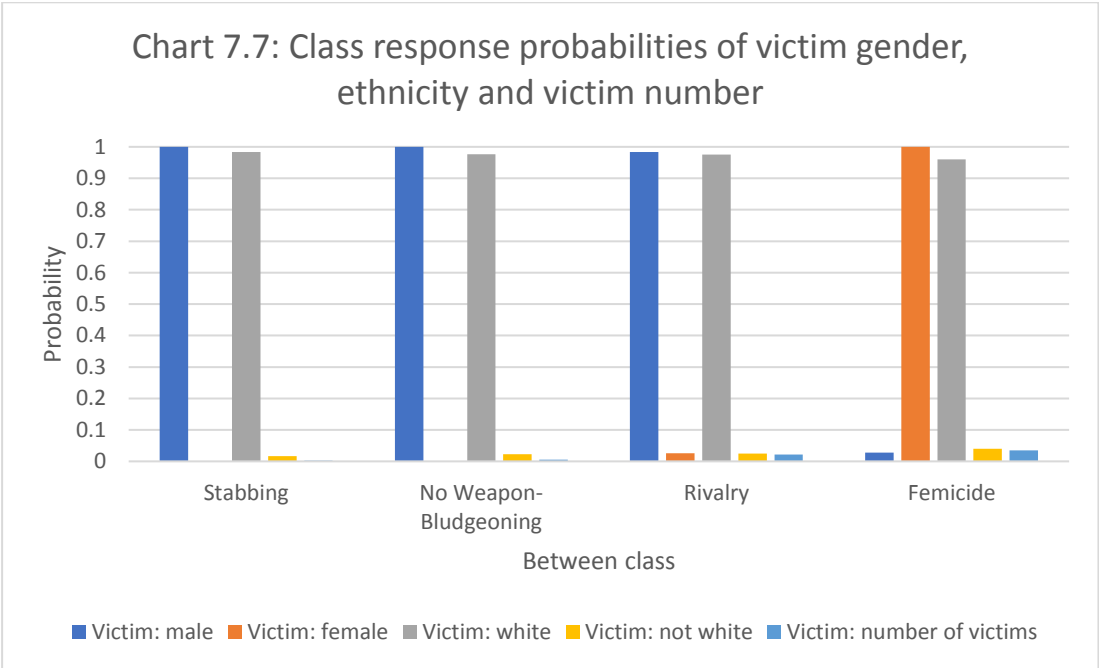


Note 1: Source: SHD. Base: n=1978

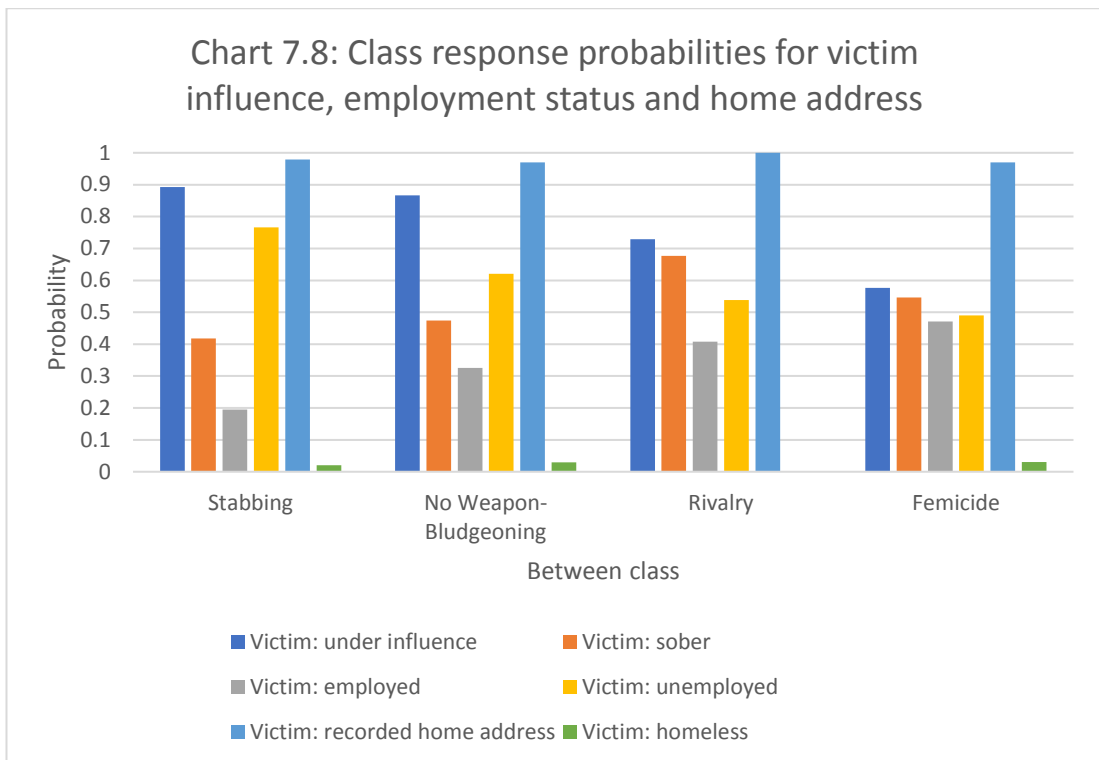
As mentioned, most of the victims of this type were women, and although the vast majority of the victims were white, the *Femicide* type included the highest number of non-white victims (3.9%) (see chart 7.7). This type also included the highest number of multiple victims (3.5%), although it was still much more common for a case to only include one victim in this type. About as many of the *Femicide* victims were under the influence of drugs or alcohol as were sober, and about half of the victims were employed (see chart 7.8). This would suggest a more stable victim profile compared

to the other three types, which showed higher levels of unemployment and use of drugs or alcohol. The age distribution was quite evenly spread for the *Femicide* victims, with the most common age being 31-45 years old (see chart 7.9).

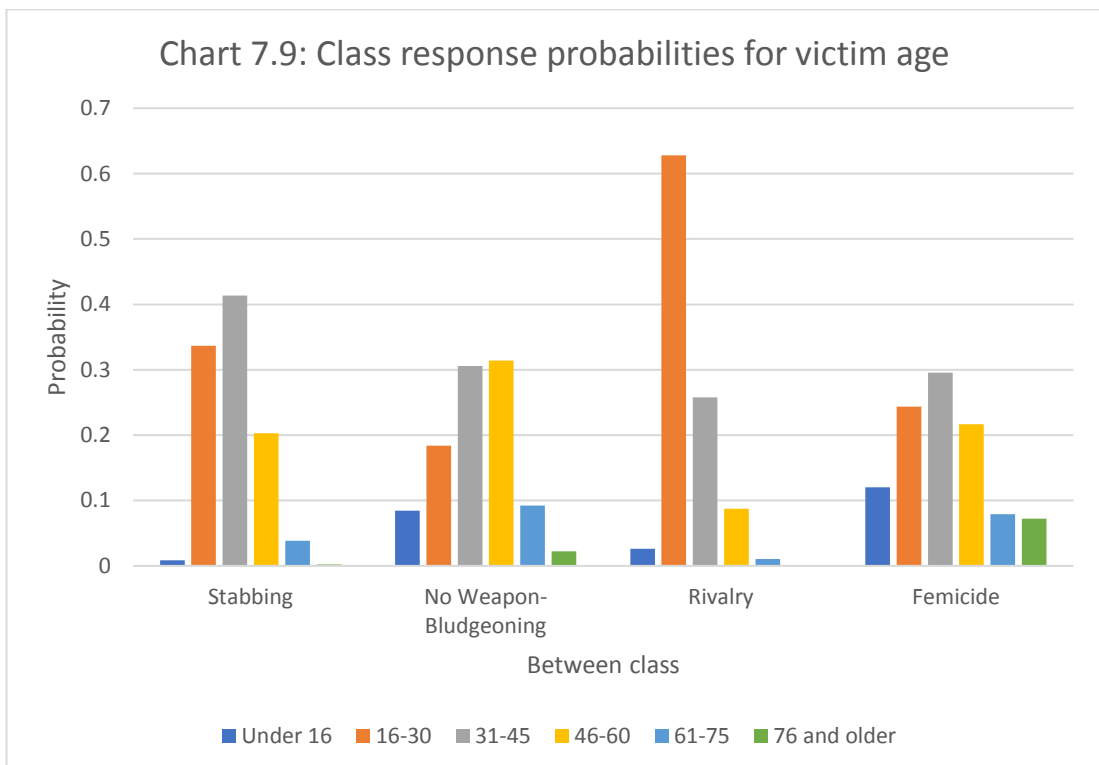
Overall, the *Femicides* would indicate a type of homicide involving the death of female victims by an intimate partner, taking place in a private setting indoors. Although the most common motive was some sort of fight or conflict, a substantial number of the homicides in this type were regarded as being motivated by a domestic dispute. This type could therefore overall be considered a domestic type of homicide. The most common method of killing was stabbing, but strangulation and murder without the use of a weapon was also quite common. This type was also very similar to the Domestic class of the single-level incident model (see Chapter 6). The next section will describe the within classes of homicide.



Note 1: Source: SHD. Base: n=1978.



Note 1: Source: SHD. Base: n=1978



Note 1: Source: SHD. Base: n=1978.

7.2.4 Within (Offender) classes

As mentioned, there were three within classes of offenders in the 4-3 model. When these three within-level classes were examined, it was revealed that the offenders were divided into two large classes (Class 1 and Class 2) and one medium sized class (Class 3) (see table 7.6). When the within classes were examined in greater detail, names for the classes were given based on their profile of classifying variables which mainly distinguished classes on the basis of age and employment status. The vast majority of the offenders in every class was white and had a recorded home address (see chart 7.10).

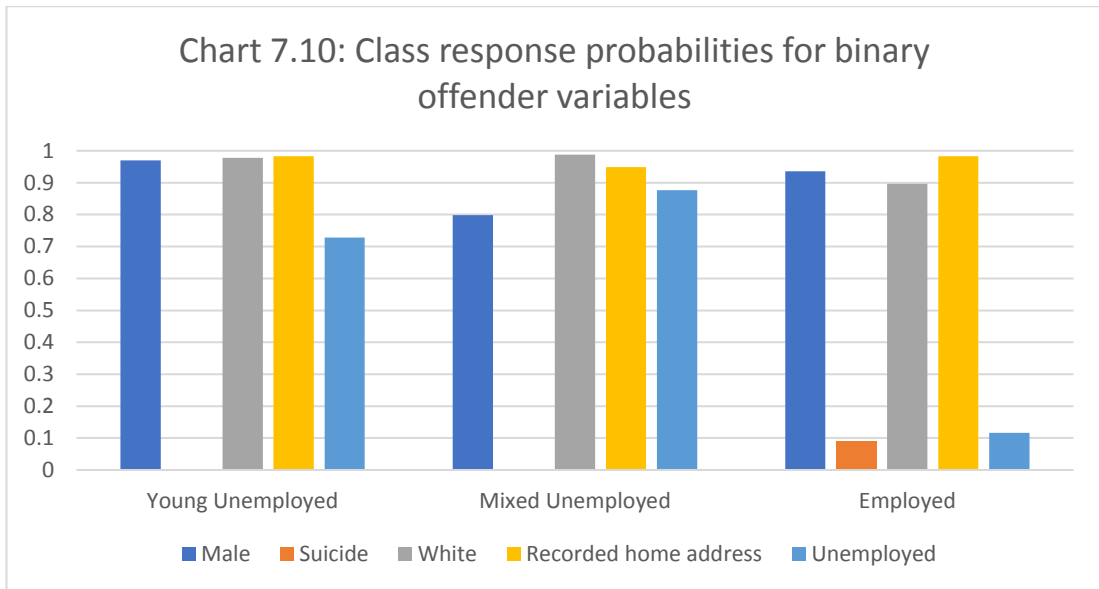
Table 7.6: Within (offender) classes

Class number	Class name	Number	Percent (%)
Class 1	Young Unemployed Offender	902	45.6%
Class 2	Mixed Unemployed Offender	854	43.2%
Class 3	Employed Offender	222	11.2%
Total:		1978	100%

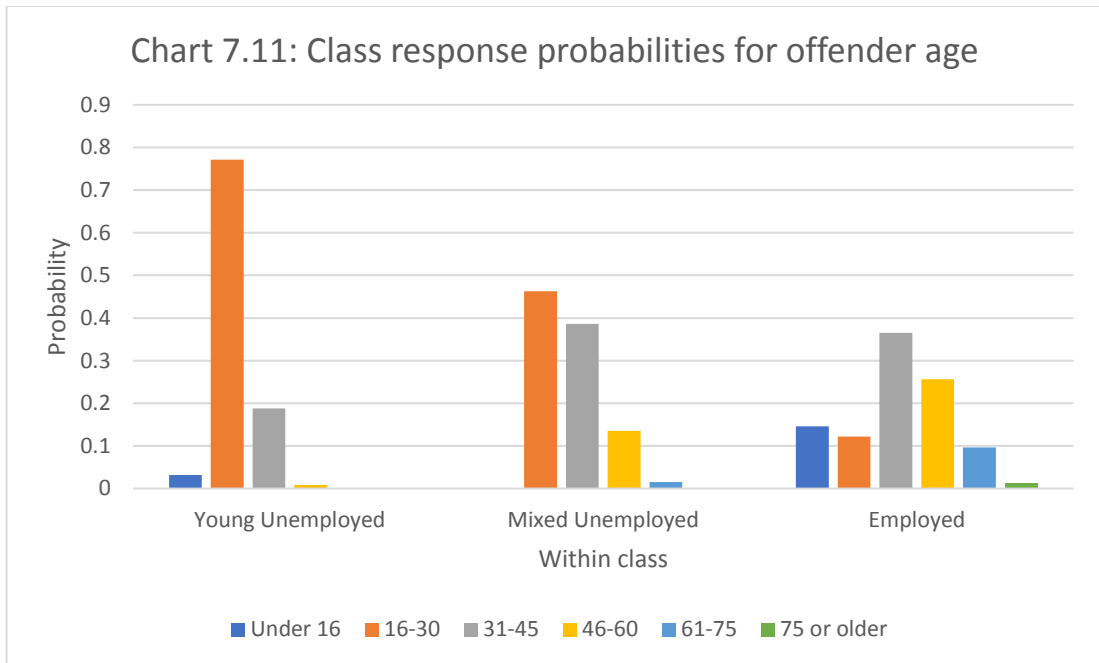
Note 1: Source: SHD. Base: n=1978

7.2.4.1 Young Unemployed Offender Class

The first offender class was labelled the *Young Unemployed Offender* class (45.6%, n=902), since it consisted of mostly unemployed men who had a most common age of 16-30 years old (see Chart 7.10-7.11). This was overall the largest offender class with more than two fifths of the sample belonging to this class.



Note 1: Source: SHD. Base: n=1978



Note 1: Source: SHD. Base: n=1978

7.2.4.2 Mixed Unemployed Offender Class

The second class was labelled *Mixed Unemployed Offender* class (43.2%, n=854). This class was very similar to the *Young Unemployed Offender* class since the majority of the offenders were unemployed, however unlike the *Young Unemployed Offender* class, this class had a more evenly distributed age (see charts 7.10-7.11). Although 16-30 years old still remained the most common age, about two fifths of the *Mixed*

Unemployed Offender class were aged 31-45 years old, and approximately another 15% were older than 45 years old. Additionally, although all of the offender classes were mostly male, the *Mixed Unemployed Offender* class had the highest average of female offenders with one fifth of the offenders being female (see chart 7.10). Both this and the *Young Unemployed Offender* class bear some resemblance to the Unemployed Male of the single-level offender model (see Chapter 6).

7.2.4.3 *Employed Offender Class*

The third and final class was the smallest class of offenders (11.2%, n=222). Unlike the two other classes, the majority of the offenders in this class were employed (see chart 7.10). The *Employed Offenders* furthermore had a higher than average percentage of non-white offenders with approximately one in ten of the offenders belonging to another ethnicity than white. Additionally, the *Employed Offender* class was the only class where the offender committed suicide after the homicide, with approximately one in ten of the offenders in this class taking their own lives. This class tended to be slightly older than the two previous classes with a most common age of 31-45 years old, and approximately another third of the offenders being older than 45 years old (see chart 7.11). This class also bears some resemblance to the Younger and Older Employed Male classes of the single-level offender model (see Chapter 6).

The two previous sections have described the between-level types and the within-level classes of homicide separately, but as mentioned, the purpose of modelling the data in this way is to examine how these two levels of classes interact. The following section will therefore describe the subtypes of homicide, which consists of the twelve possible combinations of these types and classes.

7.2.5 Subtypes of homicide

The subtypes of homicide identified in this study was made up by the different combinations of the between types and within classes and therefore amounted to a total of twelve (see table 7.7). These combinations are relevant since they represent patterns in the data of both offender and incident/victim characteristics and not just one or the other, which has been the traditional approach in typology research. For purposes of

presentation, they are presented in four groups relating to their between (incident/victim) type. Each group contains three different subtypes of homicide.

7.2.5.1 Stabbing subtypes

As previously mentioned, the *Stabbing* subtypes was the most common of all subtypes (n=630, 31.9%). The most common of the *Stabbing* subtypes was the *Mixed Unemployed Offender Stabbing* subtype which constituted 68.8% of the *Stabbing* subtypes and a fifth of all homicides, making this particular subtype the second most common subtype of homicide of the entire sample (see table 7.7). The *Mixed Unemployed Offender Stabbing* subtype was characterised by homicides mostly occurring in private settings indoors by a slightly older, unemployed male against another unemployed male of a similar age. The victim was most commonly under the influence of drugs or alcohol and the homicide occurred in the context of a fight or conflict using a sharp instrument. Most of the offenders and victims knew each other before the murder. In some instances of this particular subtype of homicide, the offender was female.

The *Young Unemployed Offender Stabbing* subtype constituted almost a third of all the *Stabbing* subtypes, and approximately one in ten cases of all homicides (see table 7.7). This subtype was characterised by younger men killing slightly older men by the use of a sharp instrument in a private, inside location motivated by some sort of fight. As in the previous subtype, the victim was most commonly under the influence of drugs or alcohol at the time of murder. In most of these cases the offender and victim were known to each other.

The final *Stabbing* subtype, the *Employed Offender Stabbing* type, was the least common of all the stabbing subtypes (1.7%), and only constituted 0.5% of the entire sample (see table 7.7). This subtype was characterised by homicides committed by a slightly older employed offender against an unemployed victim of similar age who was known to them. The homicides most commonly took place in a private, inside location by the use of a sharp weapon, motivated by some sort of fight or argument.

Table 7.7 Different subtypes of homicide

Type:	N	Percent of between group	Percent of all cases
1. Stabbing subtypes (31.9%, n=630)			
a. Young Unemployed Offender Stabbing	186	29.5%	9.4%
b. Mixed Unemployed Offender Stabbing	433	68.8%	21.9%
c. Employed Offender Stabbing	11	1.7%	0.5%
2. No Weapon-Bludgeoning subtypes (27.2%, n=540)			
a. Young Unemployed Offender No Weapon-Bludgeoning	267	49.4%	13.5%
b. Mixed Unemployed Offender No Weapon-Bludgeoning	231	42.7%	11.7%
c. Employed Offender No Weapon-Bludgeoning	42	7.9%	2.1%
3. Rivalry subtypes (24.9%, n=492)			
a. Young Unemployed Offender Rivalry	450	91.5%	22.7%
b. Mixed Unemployed Offender Rivalry	0	0.0%	0.0%
c. Employed Offender Rivalry	42	8.5%	2.1%
4. Femicide subtypes (16.0%, n=316)			
a. Young Unemployed Offender Femicide	0	0.0%	0.0%
b. Mixed Unemployed Offender Femicide	189	59.9%	9.6%
c. Employed Offender Femicide	127	40.1%	6.4%

Note 1: Source: SHD. Base: n=1978

Overall, the *Stabbing* homicides mostly occurred between slightly older men who knew each other and who were unemployed. Intoxication was common among the victims, which could indicate that the overall picture of the individuals who were victims in these homicides is one of vulnerability. Although a sharp instrument was most commonly used in the homicide, this weapon was most commonly improvised at the time of murder, which also would indicate that these homicides were rarely planned and probably erupted as a result of a fight or argument that got out of hand in an inside, private location.

7.2.5.2 *No Weapon-Bludgeoning subtypes*

The most common of the *No Weapon-Bludgeoning* subtypes (n=540, 27.2%) was the *Young Unemployed Offender No Weapon-Bludgeoning* subtype, which made up about half of the *No Weapon-Bludgeoning* subtypes and 13.5% of the entire sample (see table 7.7). This subtype was characterised by younger unemployed men killing slightly older men by the use of physical assault. The victim was most commonly under the influence of drugs or alcohol. The victim and offender were most commonly friends or associates, but in some cases, they were related. The homicides were motivated by some sort of fight or conflict and they most commonly occurred indoors in a private setting.

Almost as common was the *Mixed Unemployed Offender No Weapon-Bludgeoning* subtype, which constituted about two fifths of the *No Weapon-Bludgeoning* subtypes and 11.7% of all homicides (see table 7.7). This subtype was characterised by homicides committed by slightly older unemployed men against men of similar age and situation who knew each other prior to the murder in the context of some sort of fight or argument. In some instances, the offender of this particular subtype of homicide was female.

The *Employed Offender No Weapon-Bludgeoning* subtype was the least common *No Weapon-Bludgeoning* subtype (7.9% of the *No Weapon-Bludgeoning* subtypes and 2.1% of the entire sample, see table 7.7). This subtype of homicide was constituted by slightly older employed men killing slightly older men (who may or may not be employed) whom they knew, in the context of some sort of fight or conflict.

Overall, the *No Weapon-Bludgeoning* homicides were most commonly committed by either younger men or slightly older men against slightly older men who were either known to them, or related to them. Like the *Stabbing* homicides, both the victims and offenders may have been in a vulnerable life situation, with most of them being unemployed and the victim mostly being under the influence of either drugs or alcohol. As with the *Stabbing* homicides, most of the *No Weapon-Bludgeoning* homicides also occurred indoors in a private setting.

7.2.5.3 Rivalry subtypes

The most common of the *Rivalry* subtypes (n=492, 24.9%) was by far the *Young Unemployed Offender Rivalry* subtype. This subtype constituted 91.5% of all the *Rivalry* subtypes and more than a fifth of all the homicides, making this subtype of homicide the most common out of all the subtypes in the study (see table 7.7). The *Young Unemployed Offender Rivalry* subtype was characterised by young, unemployed men killing other young, unemployed men who were rivals, motivated by some kind of feud or faction rivalry. These homicides most commonly occurred outside in a public setting and the most common method of killing was stabbing by a sharp instrument, most of which were brought to the scene of the murder. Some of these homicides were also conducted using a firearm.

There were no *Mixed Unemployed Offender Rivalry* cases at all (see chart 7.7), but 8.5% of the *Rivalry* subtypes were characterised as the *Employed Offender Rivalry* subtype (2.1% of the entire sample). This subtype was far less common than the *Young Unemployed Offender Rivalry* subtype, and was characterised by older employed men killing younger unemployed men who were their rivals, motivated by a feud or faction rivalry. Overall, the *Rivalry* subtypes were therefore very much characterised by young, quite vulnerable offenders and victims, who killed each other in the context of feuding in public, outdoor settings. This type of encounter typically reflects a premeditated street fight between competing youths in gangs or street factions.

7.2.5.4 Femicide subtypes

The most common of the *Femicide* subtypes (n=316, 16%) was the *Mixed Unemployed Offender Femicide* subtype, which constituted almost three fifths of the *Femicide* subtypes and about one tenth of all homicides (see table 7.7). This subtype was characterised by homicides committed by slightly older men against their female partners, motivated by some sort of fight or conflict, often a domestic dispute. Some of the women killed were also other relatives of the offender, including a child, or someone otherwise known to the offender. This subtype of homicide was most commonly committed in private, indoors settings and although the most common method of killing was stabbing, some women were killed by strangulation or physical

assault. The victims were equally likely to be intoxicated as sober, so there was no clear pattern in alcohol involvement, and as likely to be unemployed as employed, so there was no clear patterns regarding employment status either. A small proportion of the victims were killed by a female offender.

There was no *Young Unemployed Offender Femicide* cases in the sample, however two fifths of the *Femicide* cases (and 6.4% of all homicides) belonged to the *Employed Offender Femicide* subtype. This subtype was characterised by slightly older, employed men killing their female intimate partners in a private, indoor setting. All in all, the *Femicide* subtypes were homicides most commonly committed by men against their female partners in private indoors locations and could be considered domestic in nature. The following section will discuss these results.

7.3 Discussion

As mentioned previously, research and statistics have shown that homicide in Scotland is falling, and has been falling for some time (see Chapter 2). Despite this, little was known about whether there were different types of homicide based on victim, offender and incident characteristics, and whether different types of homicide had decreased similarly. The findings of this chapter demonstrate that there are indeed different types of homicide in Scotland based on these variables. Overall, four major types of homicide were identified based on victim, offender and case characteristics (*Stabbing; No Weapon-Bludgeoning; Rivalry* and *Femicide*), representing latent patterns in the homicide data, with three separate classes of offenders in each (*Young Unemployed Offenders; Mixed Unemployed Offenders* and *Employed Offenders*). Although this might not be an exhaustive typology of all the different types of homicides that might exist in Scotland, it is the first step towards identifying such types and represents a significant contribution to the literature in this area since no study has examined this previously in Scotland.

Out of the four main types identified in the current study, two were relatively similar; *Stabbing* homicides and *No Weapon-Bludgeoning* homicides. Both these types of homicide were committed mostly in private settings indoors, motivated by some sort

of fight between people who were friends or otherwise known to each other. Although the victims tended to be slightly younger in the *Stabbing* type, the victims of both classes tended to be unemployed and under the influence of either drugs or alcohol when the homicide was committed. The vast majority of offenders also tended to be unemployed in both types. The main difference between these two types was the method of killing; the *Stabbing* homicides included sharp instruments whereas most of the *No Weapon-Bludgeoning* homicides were committed by the use of physical assault, or sometimes a blunt instrument. The *No Weapon-Bludgeoning* homicides furthermore had a higher probability of being committed between relatives, as well as strangers, compared to the *Stabbing* homicides which were almost always committed between known friends or acquaintances. In other words, these two types represented homicides occurring under similar circumstances but which were differentiated by the choice of weapon.

Interestingly, it was more common for the *No Weapon-Bludgeoning* homicides, which had slightly older victims, to have *Younger Unemployed Offenders*, and conversely; it was more common for the *Stabbing* homicides, which had slightly younger victims, to have *Mixed Unemployed Offenders* which tended to be more varied in age. It would therefore seem that the choice of a sharp instrument as a weapon is prevalent among all ages, whereas killing someone using physical force or sometimes a blunt instrument seems to be more common among younger offenders. Overall, what this might tell us, is that although these two types appear very similar, the *Stabbing* homicides tend to be committed against a slightly younger demographic of victims, and are more targeted towards friends or associates, whereas the *No Weapon-Bludgeoning* victims appears to be more varied in age, and include both relatives as well as strangers.

Both the *Stabbing* homicides and the *No Weapon-Bludgeoning* homicides bear some resemblance to the type called Interpersonal Dispute identified by Pizarro (2008). The Interpersonal Dispute type was a type of homicide motivated by some sort of fight or argument, which often included intoxicated victims and offenders and which commonly occurred between friends or acquaintances (Pizarro, 2008). Although the Interpersonal Dispute homicides most commonly occurred in a public, outdoors setting

which was not true for either the *Stabbing* or the *No Weapon-Bludgeoning* types, there are some strong similarities between Pizarro's Interpersonal Dispute type and the two types in the current study. Set in an American setting, Pizarro (2008) however only included a binary variable measuring the use of a gun as the method of killing, so it is impossible to know how prevalent the use of a sharp instrument was in the Interpersonal Dispute homicides.

Whether a sharp instrument was used was however included in the study by Pridemore and Eckhardt (2008), and two of the types identified in their study, the Victim Drinking homicides and the Both Drinking homicides were quite similar to the *Stabbing* homicides in the current study. The two types in Pridemore and Eckhardt's study predominantly involved men who were friends or acquaintances, where either both or just the victim were under the influence of alcohol and where a knife was used to kill the victim. The homicides furthermore most commonly took place in the home, which was very similar to the *Stabbing* homicides identified in the current study. As discussed, the variable measuring whether the offender was under the influence of alcohol or drugs was however excluded in the current study due the high levels of missingness in this variable. The levels of offender drinking can therefore not be compared with the study by Pridemore and Eckhardt (2008).

Both the *Stabbing* and the *No Weapon-Bludgeoning* types of homicides were furthermore similar to the Confrontational homicides and the Conflict Resolution homicides identified by Polk (1994). The most common motive for both the *Stabbing* and the *No Weapon-Bludgeoning* type was some sort of fight or conflict, and although the current data does not allow for analysis of the mechanisms of the fight in more detail, the analysis of masculine homicides provided by Polk (1994) share many similarities between the two types identified in the current study. Most of the offenders and victims were male, and most of them also knew each other before the homicide was committed. Since most of the homicides in these two types were committed inside in private settings, it is however more likely that these represent the Conflict Resolution homicides described by Polk since the lack of a social audience in a private setting makes the Confrontational homicides less likely.

There is however not a clear match to the *No Weapon-Bludgeoning* homicides in previous research. There might be a few reasons for this. First of all, many homicide typologies in previous research are developed in the US, where gun-related homicides are much more prevalent compared to the UK (Richardson & Hemenway, 2011). Homicides occurring with the use of a blunt instrument or by no weapons at all are therefore less common. Additionally, some typology research only includes the presence of a gun as a binary variable for this reason, such as in the study by Pizarro (2008), meaning that other methods of killing were not even measured. The *No Weapon-Bludgeoning* homicides might therefore be a slightly culture-specific finding, existing only in countries where the use of guns is less prevalent or in cultures that have a more traditional form of machismo, where knives and fists are favoured, such as in Scotland (Carnochan, 2015). This also demonstrates the context-specific nature of typologies in general. Although some types identified in the current study may be generalisable to other countries with similar contexts, certain aspects might be strongly related to the Scottish context where they were developed. The typology by Pizarro (2008) was for instance developed in an American context, meaning that firearms was much more prevalent in those types compared to the types in the current study where knives were more prevalent. It is therefore important to bear in mind that certain aspects of the current homicide typology will be different from other typologies which were developed in other contexts.

Secondly, the *No Weapon-Bludgeoning* type might not have been identified in previous studies due to the method used of identifying typologies. Many typology studies (see for instance Pizarro, 2008; Pridemore & Eckhardt, 2008) define the types based on one single variable such as motive, and not by the use of any statistical technique, meaning that some types that are distinct in the current study might have been merged in other studies. Both the *Stabbing* homicides and the *No Weapon-Bludgeoning* homicides have the same most common motive; fight, rage or quarrel. If the homicide subtypes had been disaggregated based purely on motive before comparing them, that would have meant that both these types, along with the *Femicide* subtype, would have been merged together into one type, despite the fact that these

types differ on many different variables. Although this type of *a priori* identification of subtypes is another valid method to examine subtypes, it is less exploratory (as discussed in Chapter 5). The current study identified the *Stabbing* homicides, the *No Weapon-Bludgeoning* homicides and the *Femicides* as distinct types of homicide, despite their shared most common motive, and perhaps the reason the *No Weapon Bludgeoning* types have not been identified in any previous study is due to the exploratory, data-informed nature of the current study. It can therefore be argued that the current study has provided a more nuanced understanding of homicide typologies than previously attempted, which also forms part of the original contribution of this thesis.

The *Rivalry* homicides were typically committed between rivals, motivated by some sort of feud or faction rivalry between the offender and victim. Most victims and offenders were young and male, and the most common method of killing was stabbing, with about a fifth of the cases including firearms. This was also the only subtype in which most homicides were committed outdoors and in a public setting. Additionally, the *Rivalry* homicides was the only type of homicide where it was more likely that the offender brought the weapon to the scene of the murder. However, this might also be a reflection of the location of the murder. Since the *Rivalry* homicides was the only type of homicide more likely to occur outdoors, by default the weapon would have had to be brought to the scene unless it was taken from the victim. Similarly, when the homicides occurred indoors, the choice of weapon tended to be more improvised, such as grabbing a kitchen knife that just happened to be there.

Although the *Rivalry* type was not found replicated in previous research, it does appear to typify the knife-related youth violence that has previously been discussed in the Scottish literature (Carnochan, 2015; Damer, 1990; Fraser, 2015). After a massive increase in knife carrying among young people between 1981 and 2003 in Scotland (Leyland, 2006), initiatives such as the Violence Reduction Unit in 2006 (2005 in Glasgow) (Scottish Government, 2012; VRU, 2016) and the No Knives Better Lives in 2009 (NKBL, 2014) were introduced to work towards reducing knife crime on a local level. Indeed, knife crime is also a specific focus of the general violence policy

in Scotland, alongside the focus of youth violence (Scottish Government, 2017e). The *Rivalry* homicides identified in the current study could be considered to constitute the extreme end of this violence, where young men kill each other with the use of sharp instruments in public places, motivated by some sort of feud. As the data shows in the current study, these victims and offenders also tends to be quite vulnerable, with many being unemployed and under the influence of drugs or alcohol. There was also a group of the *Rivalry* homicides which were committed by an older man against a younger man (the *Employed Offender Rivalry* subtype) which could indicate homicides committed in feuds which include several generations.

The *Femicide* type of homicide was characterised by exclusively female victims, who most commonly were the intimate partners of the offender. The *Femicides* most commonly took place indoors in a private setting, involved the use of a sharp instrument and were most commonly motivated by some sort of fight or conflict. About a fifth of the homicides were also motivated by a domestic dispute. Overall, the *Femicides* could be described as domestic in nature and this type therefore bear resemblance to many of the homicide types identified in previous studies labelled as 'Domestic'. For instance, the *Femicides* are similar to the Domestic homicide type identified by Pizarro, (2008), the 'Homicides in the context of sexual intimacy' by Polk (1994), and the Spousal Revenge type identified by Liem and Reichelmann, (2014). The *Femicide* type also bears some resemblance to Morton et al.'s (1998) typology of homicide-suicides, the Extended Parricide type identified by Liem & Reichelmann (2014), and the Intimate-Partner Domestic Lethal Violence-Suicide type identified by Wood Harper & Voigt, (2007). As mentioned, about one in ten of the *Employed Offender* class included an offender who killed themselves after the homicide was committed. Since previous research shows that it is not uncommon for certain men to kill themselves after they have killed their partner (see for instance Wood Harper & Voigt, 2007; and Liem & Reichelmann, 2014), it is likely that these cases belong to the *Employed Offender Femicide* subtype. It is therefore possible that the *Employed Offender Femicide* subtype includes a smaller subset of homicide-suicides. The *Femicide* type was furthermore the type which included the highest level of multiple victims compared to all the other between-level classes and about a fifth

of these victims were related to the offender (other than intimate partner), including their child. It is therefore also possible that the *Employed Offender Femicide* subtype might include a subset of familicides where more than one family member was murdered, and possibly even including the offender killing himself after the homicide.

Overall, that means that there is some overlap with the homicide types found in the current study to types of homicides identified in previous research. However, the typology of homicide identified in the current study can be considered more universal and distinct compared to previous typologies due to the wide range of variables and characteristics used to identify the types of homicide. Previous homicide typologies tend to focus on quite specific forms of homicides, such as homicide-suicides (Liem & Reichelmann, 2014; Morton et al., 1998; Wood Harper & Voigt, 2007), or the influence of certain variables on different types of homicides, such as alcohol (Pridemore & Eckhardt, 2008) or motive (Pizarro, 2008). Even though these studies used variables relating to the victims, the offenders and the incidents of homicide, none of these studies identified as general and yet distinct types of homicide as in the current study. The four main types of homicides identified in this research demonstrate that it is important to identify distinct patterns in regards to the victim, offender and incident-level variables in order to properly understand the dynamics of homicide. This is particularly relevant for policy and theory alike, as well as for identifying different patterns over time, which will be examined in Chapter 9.

7.4 Chapter conclusions

This chapter has provided answers for the first research question (see Chapter 3, section 3.5) and the results showed that there are different types of homicide identified in Scotland. Four major types of homicides were identified (*Stabbing, No Weapon-Bludgeoning, Rivalry* and *Femicide*), related to three different classes of offenders (*Young Unemployed Offenders; Mixed Unemployed Offenders; and Employed Offenders*), resulting in twelve different combinations of subtypes of homicide. Although there are some similarities between the types identified in the current study and types identified in previous research, this Chapter has argued that the homicide

typology identified in this research is more universal and distinct compared to previous typologies.

This chapter has identified a typology of homicide in Scotland. The subsequent chapter will identify a typology of violence before both of these typologies will be compared in Chapter 9. The next Chapter will therefore examine types of violence in Scotland.

Chapter 8: Multilevel LCA of the Violence data

8.1 Introduction

The previous two chapters have explored the homicide dataset and identified a typology of homicide, answering the first research question. As discussed in Chapter 1, section 1.1, the primary focus of this thesis was to examine homicide in the wider context of violence in Scotland. In order to contextualise the findings on homicide, this Chapter will identify a typology of violence in order to provide an answer to the second research question: What subtypes of wider violence with similar characteristics can be identified? The change in the violence typology will be examined in the next chapter and the next chapter will also be comparing the two typologies (homicide and violence) over time.

This chapter will start by presenting a descriptive analysis of the classifying variables used to identify the different subtypes of violence. Unlike with the homicide dataset, the analysis will then move straight into the Multilevel LCA modelling of violence, and will not explore how the violence variables have changed over time or the single-level LCA models of violence. As explained in Chapter 4, section 4.4.1, this was done for three main reasons: firstly, since homicide was the main focus of the research, less focus is given on the analysis of the violence dataset. Secondly, since the problem of missing data was considerably lower in the violence dataset compared to the homicide dataset, the examination of the change in valid percent in the variables over time had less relevance with the violence data. Thirdly, since the violence LCA modelling was designed to be as similar as possible to the homicide dataset, examining the single-level models of violence was less relevant.

Consequently, it was decided to not examine the change in valid percent over time of the classifying variables of the violence dataset or to conduct single-level models of violence. Instead, the descriptive features of the classifying variables and the covariates across the whole violence dataset was outlined and was followed by the multilevel LCA model of violence. The violence model had two levels: one within

level, which consisted of the incident and offender variables, and one between level, consisting of the victim variables.

It will be argued that the best fitting solution was a 4-2 model, with four within types of violence (*Domestic; Public No Weapon; Public Weapon, and Work-related*) and two between classes of victims (*Male victims and Female victims*), resulting in a total of eight different subtypes of violence. The following section will begin by outlining the descriptive features of the classifying variables of violence.

8.2 Descriptive data analysis of classifying variables

As described in Chapter 4, the violence dataset is a pooled survey dataset based on five different sweeps of the Scottish Crime and Justice Survey (SCJS): 2008-09; 2009-10; 2010-11; 2012-13 and 2014-15. Weights were applied to this pooled dataset in order to ensure that the sample was representative of Scotland overall (see Chapter 4). Throughout this chapter, the percentages presented will therefore be based on the weighted data, and the raw numbers, which are the incidents of violent crime reported (n=2097), will be presented as the unweighted base. This was done for sake of clarity and is common practice when presenting SCJS data (see for instance Scottish Government, 2016e). Two datasets will be used in the next sections when describing the variables: the victim dataset, based on the victims; and the incident dataset, based on the incidents and offender variables. These two datasets are discussed further in Chapter 4, section 4.4.

Like the homicide dataset, the violence dataset is hierarchical in nature, since any victim interviewed could report more than one crime (see Chapter 4, section 4.4). Therefore, in the modelling presented in this chapter, the violent incidents (n=2097) constitute the within-level, and the victims reporting the violent incident (n=1879) represent the between-level in the data. The victim variables will be described on the victim level, whereas the incident and offender⁷⁸ variables will be described on the incident level (see Chapter 5). As discussed in Chapter 4, section 4.4.1, this was

⁷⁸ The offender variables are summarised on the incident-level in the SCJS pooled dataset (see Chapter 4).

slightly different from the homicide model where the within level was based on the offenders and the between level was based on the incident and victims. Although this proved to be the best way to model the homicide data, the same structure could not be applied to the victim data for two main reasons. Firstly, the data structure of the violence dataset was different since any victim could report more than one incident, meaning that the within level was constituted by the incident variables, not the offender variables. Secondly, the information about offenders is limited in the SCJS, and what is known, is estimated by the victims. This means that the information about the offender is less robust than the victim or incident variables and is therefore not suitable to constitute the within level. Although the differences in model structure was unavoidable, it does constitute a limitation of the analysis since this creates differences between the homicide model and the violence model. It is therefore important to keep this limitation in mind when comparing the two typologies.

In total, 54 classifying variables and 4 covariates were included in the analysis of this chapter (see tables 8.1-8.10). All but two of the classifying variables (victim and offender age) were binary variables. These classifying variables were chosen in order to make the violence model as similar as possible to the homicide model (see Chapter 7). This meant that, where possible, the same variables were included regarding the victims, offender and incidents of violence (see Chapter 4 for more detail). These variables have furthermore been found to be relevant in previous typology research (see for instance Bijleveld & Smit, 2006; Harper Wood & Voigt, 2007; Holtzworth-Munroe, 2000; Pizarro, 2008; Pridemore & Eckhardt, 2008). For model parsimony, variables with less than $n=20$ were combined with another variable when there were substantive reasons for doing so, just like the homicide data. For instance, 'Other household member' as a relationship ($n=12$) was combined with 'Friend or Acquaintance'. The next four sections will describe the victim variables, the offender variables, the incident variables and the covariates included in the multilevel LCA model of violence.

8.2.1 Victim variables

In total, there were $n=1879$ (89.4% of the cases) victims in the 2097 cases of violent crimes, meaning that some victims reported multiple instances of victimisation⁷⁹. As discussed, this is different from the homicide model where each victim only could be represented once. A total of five victim variables were introduced in the model: Gender; Age; Ethnicity; Residential status; and Employment status (see table 8.1). The victim age variable (and the offender age variable, see next section) were different from the age variables in the homicide dataset due to limited information about the offenders in the violence dataset. For consistency within the violence typology, it was decided to code the victims and the offenders the same within the violence dataset, even though this meant that the age bands were slightly different from the homicide dataset.

This is the only place in the study where the victim dataset is utilised, and this was done in order to provide an appropriate description of the victims in the data. Since the incidents were clustered within the victims, and this hierarchical structure was modelled in the multilevel LCA model, it is relevant to understand what the between-level of victims looked like. If the victim variables were described at the incident-level, the information would not reflect the actual victims in the data since the same victim could appear more than once. Like the homicide data, the valid percent will be presented and discussed in this section.

Table 8.1 shows that almost two thirds of the victims of violence were male. This was slightly lower compared to the victims of the homicide dataset, which were almost 80% male (see table 6.1). The most common age of the victims in the violence dataset was 16-24 years old; a little more than a third of the victims were of this age. Another third of the victims were aged 25-39 years old (see table. 8.1), meaning that more than 70% of the victims were younger than 40% years old. Although the age categories were slightly different from the homicide dataset, the victims of the violence dataset

⁷⁹ This is different from repeat victimisation (described in table 8.2). In total, there were 1879 victims that reported 2097 violent crimes, and some of these instances of violence could be repeated acts of violence, meaning that the same types of violent crime occurred on more than one occasion.

were similar to the homicide victims in that more than 70% of the homicide victims were younger than 46 years old (see table 6.1).

Table 8.1: Classifying variables of the LCA victim models

Victim variables		Valid %	Missing (% of total)
Gender	Male	63.7%	0.0%
	Female	36.3%	
Age⁸⁰	16-24 years old	36.1%	0.0%
	25-39 years old	34.2%	
	40 years old and older	29.7%	
Ethnicity	White	96.6%	0.0%
	Other than white	3.4%	
Residential status	Lived in Social Housing	32.5%	0.7%
	Other accommodation ⁸¹	67.5%	
Employment status⁸²	Unemployed	38.4%	13.8%
	Employed	61.6%	

Note 1: Source: SCJS pooled dataset. Base: n=1879.

Note 2: Valid percentage was calculated based on the number of victims with the missingness excluded.

Note 3: The missing values includes refused and don't know and is calculated of the total weighted n.

For reasons of disclosure control, as well as to match up with homicide ethnicity, all other ethnicities besides white were grouped together into a category called 'other than white', which only included little more than 3% of the cases (see table 8.1). This figure was very similar to the homicide dataset, where little more than 2% of the victims were

⁸⁰ Age was recoded so that it would match the same age spans as was known for the offenders.

⁸¹ This includes owning a house, private housing and other.

⁸² Employed includes: Intermediate occupations; Managerial and professional occupations; and Routine and manual occupations. Unemployed includes Not Working and Long-Term Unemployed.

of another ethnicity than white. The majority of the victims did not live in social housing but in other forms of accommodation such as private housing (see table 8.1). About a third of the victims resided in social housing, which is slightly higher than expected when comparing to national estimates from Scotland's census data (Scotland Census, 2016). The national census suggests that approximately 24% were rented from the council or from another social housing provider. As described in Chapter 4, section 4.4.3.1, the homicide data measured homelessness and not social housing. When this information was known, homelessness among the homicide victims only constituted 2.2% and was considerably less common than residing in social housing (see table 6.1). As can be seen from table 8.1, approximately three fifths of the victims in the violence data were employed when the crime was committed. This is in contrast with the homicide data where more than three fifths were unemployed (see table 6.1). The following section will describe the offender variables used in the study.

8.2.2 Offender variables

As mentioned, the offender variables were summarised on the incident level since the victims were asked to describe the offender in each incident. The current and following sections will therefore be described on the incident-level. It is also important to note that the offenders were described by the victims in this dataset, and were not interviewed themselves. All variables relating to the offenders should therefore be interpreted as the victim's perceptions of the offenders. This also means that the offender data could only be provided in cases where the victim could say something about the offender. In cases where the victim was unable or unwilling to do this, the offender variables were coded as missing. As discussed above, this means that the information about the offenders in the violence dataset has limited quality and since this constitutes a limitation of the current study, it is important to keep in mind when interpreting these results.

Only four offender variables could be included in the model, as shown in table 8.2. Where information was known about the offender, almost four fifths of the cases included a male offender. In 7.5% of the cases there were both a male and female offender involved. Overall, this was quite similar to the homicide data where

approximately 90% of the offenders were male (see table. 6.4). The most common age of the offenders in the violence dataset was 16-24 years old, with approximately two fifths of the cases including an offender of this age (see table 8.2). Another third of the cases included an offender between 25-39 years old. Although more than 80% of the offenders were younger than 40 years old, it was more common that the offender was older than 39 years old than younger than 16 years old. Despite the differences in the age variables between the violence and homicide datasets, it appears that the homicide offenders were marginally younger than the offenders of violence; more than 90% of the homicide offenders were younger than 46 years old (see table 6.4).

Table 8.2: Classifying variables of the LCA offender variables

Offender variables		Valid N (%)	Missing (% of total)
Gender	Male	79.3%	18.2%
	Female	13.3%	
	Both	7.5%	
Age	Under 16 years old	10.4%	18.6%
	16-24 years old	39.1%	
	25-39 years old	33.4%	
	40 years old and older	17.1%	
Influenced by alcohol or drugs	Under the influence	70.4%	9.7%
	Sober	29.6%	
Ethnicity	White	4.2%	18.4%
	Other than white	95.8%	

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: Valid percent is calculated on the known values, with the missing values excluded.

Note 3: The missing values includes refused and don't know and is calculated of the total weighted n.

Almost three in four of the cases included an offender who was under the influence of either alcohol or drugs when the crime was committed (see table 8.2). This figure was quite similar to when this was known for the homicide offenders: more than 90% of the homicide offenders were under the influence when the crime was committed (see table. 6.4). Like the victims, the vast majority of offenders in the violence dataset were white; only 4.2% of the cases were reported to include an offender of another ethnicity than white (see table 8.2). This was marginally higher than in the homicide offenders where 2.4% of offenders belonged to another ethnicity than white (see table 6.4). The next section will describe the incident variables of the violence model.

8.2.3 Incident variables

In total, 42 binary variables measuring seven different constructs relating to the violent incident were included in the model (see tables 8.3-8.8). These seven different constructs were: Motive; Relationship between offender and victim; Weapon used; Violence used; Injuries sustained; Location; and General incident variables. As mentioned in Chapter 4, the influence status of the victims varies on the incident level, and not on the victim level since the victims were asked about their own influence in relation to each violent incident. This variable will therefore be reported in this section.

The most common motive given by the victim was the offender being under the influence of either alcohol or drugs at the time of the violent incident (see table 8.3). Almost half of the cases had this reported motive. The second most prevalent motive was personal history or relationship between offender and victim with approximately a fifth of all cases having this reported motive. Another 16.8% of the violent crimes were opportunistic or motivated by mindlessness of the offender, making this the third most common motive. As can be seen from table 8.3, the motives reported by the victims were quite different from the motives reported in the homicide data. This was mainly related to the fact that the motives in the homicide dataset was reported by the police as a result of their investigation, whereas the motives reported in the violence dataset were reported by the victims. This means that although informative, the motives in the two datasets (homicide and violence) were not very comparable.

Table 8.3: Motive

Motive	Percent
Offender drunk or on drugs ⁸³	47.6%
Personal relationship or history between offender/victim	21.1%
Opportunist/mindlessness/easy target ⁸⁴	16.8%
Victim specifically targeted by offender ⁸⁵	8.6%
Mental health problem of the offender ⁸⁶	8.3%
Theft ⁸⁷	4.6%
Other ⁸⁸	15.2%

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: Valid percent is calculated on the known values, with the missing (3.4%) excluded.

Note 3: The missing (3.4%) includes refused and don't know and is calculated of the total weighted n.

Note 4: Due to the possibility of multiple responses the total valid N does not always equate 100%.

The most common relationship between offender and victim was 'stranger' – i.e. they were not previously known to each other; about two fifths of the offenders were described as strangers by the victims (see table. 8.4). More than a third of the offenders were however reported as 'well known' by the victims (see table 8.4). When the victim and offender knew each other well, the most common relationship was a current or former romantic partner; little more than one in ten of the relationships was characterised in this way by the victims. Another 8.3% of the relationships were described as a friend, acquaintance or neighbour. This was quite different from the homicide data, where the most common relationship between victim and offender (48.3%) was someone known, like an acquaintance or friend (see table. 6.7). Only about 8% of the homicide cases were committed between strangers.

⁸³ Important to note here is that this motive includes two assumptions made by the victims; what the motive of the offender was and that the offender was under the influence of either drugs or alcohol.

⁸⁴ This also includes: something to do; spur of the moment; taking advantage; young people; and for fun.

⁸⁵ Includes part of series of crimes happening in the area of which the victim resides.

⁸⁶ As estimated by the victim.

⁸⁷ Including that the offender was after either money or property as motive for the crime.

⁸⁸ This also includes carelessness or negligence on behalf of the victim.

Table 8.4: Relationship between offender and victim

Relationship	Percent
Stranger	39.4%
Just known by sight	16.9%
Just spoke to casually	9.2%
Known well: Total	35.5%
Known well: Current or former romantic partner ⁸⁹	10.9%
Known well: Child	1.0%
Known well: Relative	2.0%
Known well: Friend or acquaintance ⁹⁰	8.3%
Known well: Known from work	7.5%
Known well: Other ⁹¹	5.8%

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: Valid percent is calculated on the known values, with the missing (3.4% of total) excluded.

Note 3: The missing (18.2%) includes refused and don't know and is calculated of the total weighted n.

⁸⁹ Includes wife/husband and girlfriend/boyfriend.

⁹⁰ Includes neighbour and other household member.

⁹¹ Includes young people in the neighbourhood, and 'none of the above'.

Table 8.5: Weapon used

Weapon	Percent
No weapon	74.8%
Sharp weapon	11.6%
Glass or bottle	7.8%
Hitting implement	4.6%
Firearm or gun	0.5%
Other ⁹²	6.9%

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: Valid percent is calculated on the known values, with the missing (3.9% of total) excluded.

Note 3: The missing (3.9%) includes refused and don't know and is calculated of the total weighted n.

Note 4: Due to the possibility of multiple responses the total valid N does not always equate 100%.

Table 8.6: Violence used

Violence	Percent
Punched or slapped	62.7%
Grabbed, pushed or pulled	42.2%
Kicked	23.8%
Hit with a weapon	9.9%
Stabbed or cut	2.4%
Other violence ⁹³	3.0%

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: Valid percent is calculated on the known values, with the missing (16.3% of total) excluded.

Note 3: The missing (16.3%) includes refused and don't know and is calculated of the total weighted n.

Note 4: Due to the possibility of multiple responses the total valid N does not always equate 100%.

The victims were asked whether or not the offender used a weapon during the offence. The vast majority of cases did not include a weapon (see table 8.5). When a weapon

⁹² Including stone or brick.

⁹³ Other violence includes violence that was not included in any of the categories above.

was used, a sharp weapon was most commonly reported, with little more than one in ten using this type of weapon, followed by a glass or bottle. As shown in table 8.6, the most common type of violence reported by the victims was being punched or slapped with three fifths of the victims reporting this type of violence. In more than two fifths of the cases, the victim reported being grabbed, pushed or pulled and almost a fifth of the victims reporting being kicked. Very few of the cases included reports of sexual victimisation.

As can be seen from table 8.5 and 8.6, there was some overlap between the categories of weapon used and violence used, however, unlike the homicide data, there was too much variation in the use of weapons and violence to combine these two variables in a satisfactory manner. For instance, although some incidents of violence which included a sharp weapon also involved stabbing or cutting as a violent act, many of these incidents involved other forms of violence. It was therefore decided not to combine these variables like the homicide variable Method of killing, since this would mean loss of information as well as misrepresenting the data. When comparing to the homicide data overall, it can however be seen that weapons appear more common in homicides compared to violent incidents. While approximately 75% of the violent incidents did not include a weapon, only 22.5% of the homicides did not involve the use of a weapon (see table 6.7).

When the injuries sustained by the victims were examined, it was revealed that the most common injury reported was bruising or a black eye with almost half of the victims reporting this injury (see table. 8.7). In almost one in five cases, cuts, scratches, gashes or punctuations of their skin were reported. In approximately 7% of the cases the victim reported head injuries or internal injuries.

Table 8.7: Injuries sustained

Injuries	Percent
Bruises or black eye	45.5%
Cuts, scratches, gashes or punctuation of skin	22.1%
Broken limbs (including nose), dislocated joints or chipped/lost/broken teeth	6.9%
Head injuries, severe concussion, loss of consciousness or internal injuries	6.9%
Other	3.2%

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: Valid percent is calculated on the known values, with the missing (14.4% of total) excluded.

Note 3: The missing (14.4%) includes refused and don't know and is calculated of the total weighted n.

Note 4: Due to the possibility of multiple responses the total valid N does not always equate 100%.

When the location of the violent crime was examined, it was found that the majority of all crimes occurred in a public place other than outside of the victim's home (see table 8.8). Almost two fifths of all the violent crimes took place in a public place such as a bar or pub or around the city centre. Another quarter of the crimes took place in or around the victim's place of work and little more than one in ten of the violent crimes took place inside the home of the victim. Although the information about the location of the violent incident was more detailed in the violence dataset compared to the homicide dataset, this was different from the homicide data, were little more than half of homicides occurred in private places (see table 6.7).

Table 8.8: Location of the violent incident

Location	Percent
In or around victim’s place of work	26.3%
Inside of victim’s home	12.4%
Just outside of victim’s home	11.3%
Other public place ⁹⁴	39.6%
Other private place ⁹⁵	5.5%
Other ⁹⁶	4.9%

Note 1: Source: SCJS pooled dataset. Base: n=2097
Note 2: Valid percent is calculated on the known values, with the missing (2.6% of total) excluded.
Note 3: The missing (2.6%) includes refused and don’t know and is calculated of the total weighted n.
Note 4: Due to the possibility of multiple responses the total valid N does not always equate 100%.

When the general incident variables were examined, it was found that it was about as common for a case to include repeat victimisation as it was for a case to include a one-off violent crime (see table 8.9). In total, little more than half of all violent crimes were part of a series of repeated incidents, meaning that the violent crime the victim reported had happened on more than one occasion. Violent crime were about as likely to take place during daytime (morning or afternoon) as in the evening or night (see table 8.9).

⁹⁴ Other public place include: In or around a pub, nightclub, bar etc; in a public car park; in/around football or other sports ground; in/around sports centre or club; In/around place of entertainment; while travelling or near transport facilities; In/around town, city centre or a shop, supermarket or precinct; street, road or subway; at a park or other common public space, incl. building site and caravan park.

⁹⁵ Including the house of a friend or acquaintance

⁹⁶ Including crimes occurring online

Table 8.9: Repeat victimisation, daytime and victim influence status

Incident variables		Valid Percent	Missing (% of total)
Repeat victimisation	Single incident	46.6%	0.0%
	Part of series of incidents	53.4%	
Time of day	Daytime (morning/afternoon)	54.1%	1.5%
	Night-time (evening/night)	45.9%	
Victim influence status	Victim under influence	29.5%	15.9%
	Victim not under the influence	70.5%	
Sexual aspect	A sexual aspect to the crime	0.7%	16.2%

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: Valid percentage was calculated based on the number of victims with the missingness excluded.

Note 3: Missing includes refused and don't know and is calculated of the total weighted n. This also includes all the responses from 2010-11. Due to errors in the coding this variable was excluded from the dataset for this year (n=357).

When the influence status of the victims just before the crime was examined, it was revealed that almost two thirds of the cases included a victim who were sober when the crime was committed (see table 8.9). Three in ten victims reported being under the influence of either drugs or alcohol, or both, when the crime was committed. Unlike the offenders of violence, it was more common for the victims to report being sober than under the influence when the crime was committed. There could however be reporting error regarding this variable since victims may not have wanted to disclose their drinking or drug use. The next section will describe the covariates used in the model.

8.2.4 Covariates

As mentioned, four binary covariates measuring time were included in the two-level LCA model. Covariates were introduced in the model in order to examine the effect of time on the different classes, and how the different types of violence have changed over time in relation to each other. Each covariate measured a survey sweep, with the

first survey year as the reference year (see table 8.10). This meant that the change in the different types could be compared to each other over time. As can be seen from table 8.10, violent incidents have halved over the past five survey sweeps. This is a noticeable decline in reported violence, which also mirrors the marked decline in homicide over this time (see table 7.2).

Table 8.10: Survey years as covariates

Year	Valid percent
2008-09	29.7%
2009-10	24.2%
2010-11	13.8%
2012-13	17.2%
2014-15	15.0%

Note 1: Source: SCJS pooled dataset. Base: n=2097
Note 2: The missingness is 0% in these variables.

Overall, there are many similarities between homicide and violence when examining the descriptive characteristics of these crimes. The victims of homicide and violence were quite similar, although unemployment was higher among homicide victims. Offenders of both homicide and violence were also similar when this information was known, although homicide offenders tended to be slightly younger. There were more differences between the incident variables of violence and homicide, however. It was more common for homicide incidents to involve weapons, strangers and private locations compared to violent incidents.

This and the previous sections have described the classifying variables and the covariates used in the multivariate LCA model of violence. The next section will describe the modelling and the identification of types and classes.

8.3 Two-level LCA of violence data

As mentioned in the introduction, the description of the change in valid percent of the classifying variables over time and the single-level models is excluded from this chapter. Instead, this section will delve right into the two-level modelling of the violence data. As described in Chapter 5, section 5.3.2, the within-level of the violence model consisted of the incident and offender variables, and the between-level consisted of the victim variables. The two-level LCA modelling was conducted on all data with the weights applied, including the missingness.

8.3.1 Deciding on the number of classes

As with the multilevel LCA model of homicide, different combinations of within (incident/offender) and between (victim) models were run, starting with a 2-1 model⁹⁷. As with the homicide model, the 1-2 and 2-1 models were only included to ensure none of these models demonstrated superior fit statistics (AIC, BIC and ABIC) and will not be examined any further. All models included covariates and were run with weights applied. The models were thereafter rerun four times up to a 4-3 model (see table 8.11). A 4-4 model was run but did not manage to converge, even after the number of random starts had been increased by more than 400% from the first model. Four statistical measures of fit (AIC, BIC, Percent change in BIC and ABIC) were evaluated alongside the entropy value. The best models were then compared in order to find the model of highest substantive interest. See Appendix 8.1 for full Mplus syntax.

⁹⁷ As with the homicide model, the 1-1 model was not possible to run (see footnote 77).

Table 8.11: Class selection statistics of two-level LCA Violence model

No. of classes (within-between)	Loglikelihood value	AIC	BIC	Percent change in BIC	ABIC	Entropy
1-2	-44878.38	89908.75	90338.02	N/A	90096.56	1.000
2-1	-45756.44	91738.89	92377.14	2.26	92018.13	0.944
2-2	-44207.10	88656.20	89339.64	-3.29	88955.21	0.892
2-3	-43409.58	87077.16	87805.78	-1.72	87395.94	0.915
2-4	<i>-42858.40</i>	<i>85990.81</i>	<i>86764.62</i>	<i>-1.19</i>	<i>86329.36</i>	<i>0.927</i>
3-2	-47696.49	95748.99	96754.38	11.51	96188.86	0.927
3-3	-46114.25	92602.50	93658.72	-3.20	93064.60	0.939
3-4	<i>-45057.35</i>	<i>90506.71</i>	<i>91613.77</i>	<i>-2.18</i>	<i>90991.06</i>	<i>0.973</i>
4-2	-51393.69	103257.38	104584.73	14.16	103838.12	0.963
4-3	-49015.91	98521.82	99905.64	-4.47	99127.25	0.953

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: Models in italics failed to replicate the best loglikelihood value, even with more than 400% increase in random starts compared to the 1-2 model.

As can be seen from table 8.11, the 2-3 model had the best AIC, BIC and ABIC values, whereas the 4-2 model had the highest entropy value beyond the 1-2 and 2-1 models. Models which failed to replicate the best loglikelihood value were not considered. Both of the best fitting models (2-3 and 4-2) were examined in greater detail in order to determine which model was the most substantively meaningful.

As can be seen from table 8.11, priority was given to the within classes (incidents and offenders) when comparing the models. This was because the study is primarily focused on the classification of violent incidents, not victims. When the 2-3 violence model (see appendix 8.2) was compared to the 4-2 model it was found that the within classes of the 4-2 model were more informative compared to the 2-3 model. The two within classes of the 2-3 model were quite similar, whereas the four within classes of

the 4-2 model demonstrated different patterns on most classifying variables. As with the homicide model, two within-level classes were less substantively interesting than four classes, and the 2-3 model was therefore considered to be too simplistic. The additional between class of the 2-3 model did furthermore consist of all males between 25 and 39 years old, which was not considered particularly substantively relevant. This third between-level class was neither older nor younger than the other two classes. Seeing that the 4-2 model appeared more substantively meaningful overall for the current study, the 4-2 model was chosen to be the best fitting model. The section below will provide a description of the four within types of the violence model.

8.3.2 Within (Incident and Offender) Classes

As mentioned, the selected model of violence was a 4-2 model, meaning that there were four within types and two between classes. As with the homicide classes, the within and between classes of violence were named after the most distinguishing traits (see Chapter 5, section 5.3.3). Since the within classes were of primary interest, the within-level classes of the violence dataset will therefore be referred to as ‘types’, while the between-level classes will be referred to as ‘classes’. The combination of types and classes will be referred to as ‘subtypes’ of violence (see section 8.3.3).

When the four within types of the 4-2 model were examined, it was revealed that the model split the data into four medium sized types (see table 8.12). When the within types were examined in greater detail, names of the types could be given based on the characteristics of the variables in each type (see charts 8.1-8.9 and table 8.12). Due to the high number of classifying variables, the types will be presented in groups of classifying variables for clarity, just as with the homicide model (see Chapter 7). As with the homicide typology, although the types will be described in almost deterministic terms for the sake of clarity, the types are all based on probability (see Chapter 5).

Table 8.12: Within (Incident and offender) types

Type number	Class name	Number	Percent (%)
Type 1	Domestic	608	29.0%
Type 2	Public No Weapon	583	27.8%
Type 3	Public Weapon	503	24.0%
Type 4	Work-related	403	19.2%
Total:		2097	100%

Note 1: Source: SCJS pooled dataset. Base: n=2097

8.3.2.1 Domestic type

The first type was called *Domestic* (29.0%, n=608) since the most distinguishing features of this type was that the most common relationship between the victim and the offender was a current or former intimate partner (35.8%, see chart 8.1), and the most common motive of this type was a personal history or relationship between the offender and the victim (50.0%, see chart 8.2). About two fifths of the crimes were committed inside the victim’s house, and another quarter were committed just outside the victim’s home (see chart 8.3). Most offenders in this type were male (70.1%) but this class included the highest proportion of female offenders; almost a quarter of the cases included a female offender (see chart 8.4). The vast majority of the offenders were of a white ethnicity. The offenders in the *Domestic* type tended to be slightly older compared to the other types and were most commonly aged 25-39, while almost a third of the offenders were 40 or older (see chart 8.5). Three fifths of the offenders in this type were under the influence of alcohol or drugs (see chart 8.4), whereas almost a quarter of the victims were under the influence (see chart 8.6), although this might be slightly under-reported. More than one third of the crimes in this type were repeated instances of violence rather than a one-off crime (see chart 8.6). About half of the cases in the *Domestic* type occurred during the day (54.9%)

About three fifths of Domestic cases included violent acts of punching and the same proportion also included violent acts of grabbing with another fifth the cases including instances of kicking (see chart 8.7). The most commonly reported injuries in this type

was bruising (52.4%) and cuts or scratches (21.2%) with about 6% of cases including severe head injuries or internal head injuries (see chart 8.8). The vast majority of the cases in the *Domestic* type did not include any weapons (see chart 8.9).

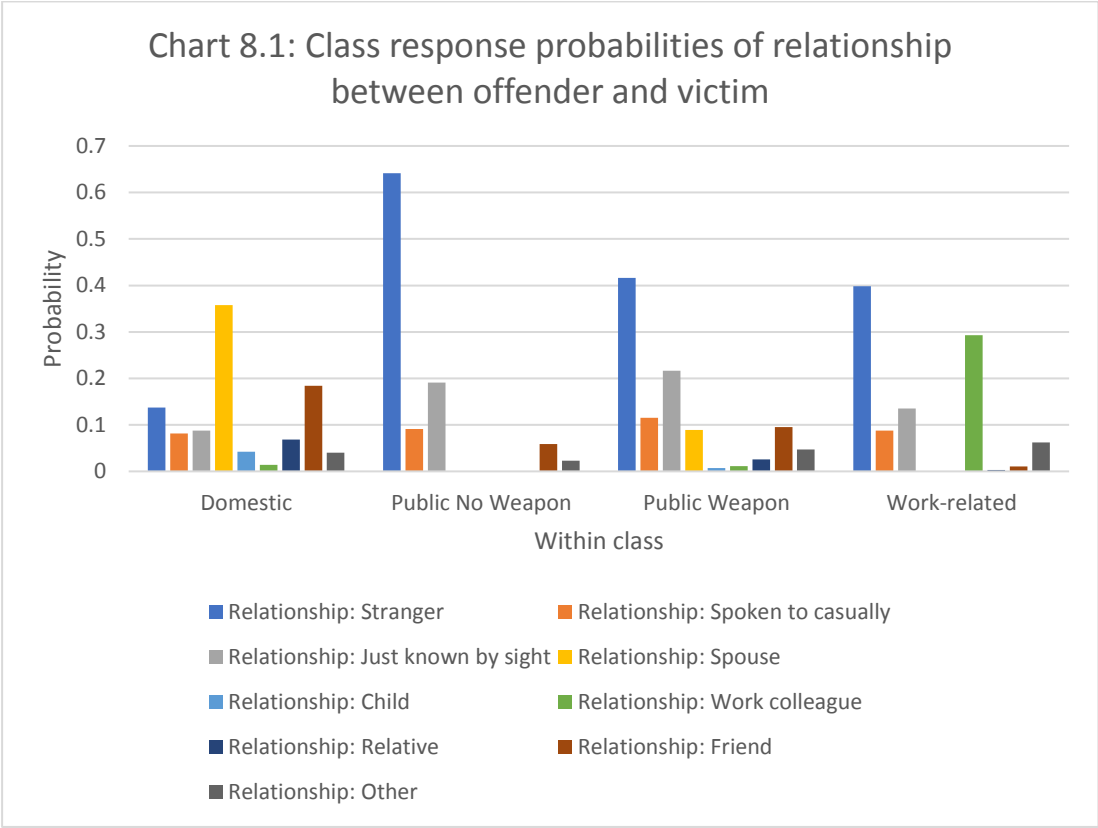
Overall, The *Domestic* type would indicate a type of violence occurring between intimate partners, motivated by some sort of previous history or fight between the offender and victim, taking place inside or adjacent to the victim's own home. The offenders tended to be male, and between 25-39 years old, and the offenders were more than twice as likely to be under the influence of drugs and alcohol than the victim.

8.3.2.2 *Public No Weapon type*

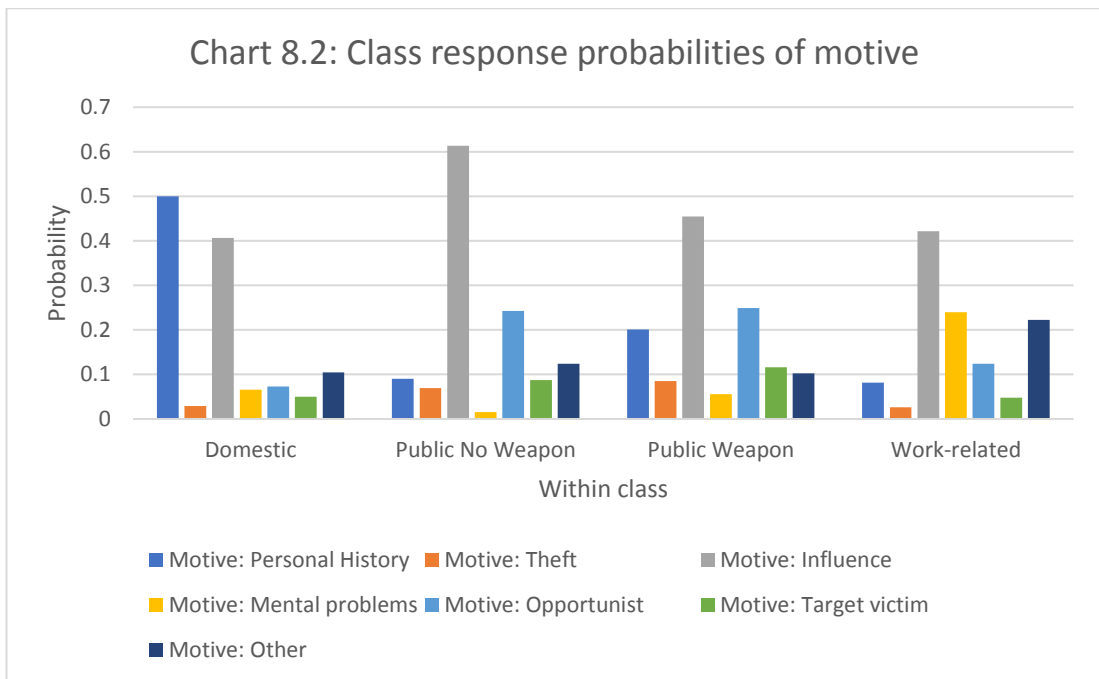
The second type, labelled the *Public No Weapon* type (27.8%, n=583) was characterised by a majority of male offenders who were mostly under the influence of drugs or alcohol (see chart 8.4). More than half of the offenders of this type was aged 16-24 at the time of crime (see chart 8.5) and the vast majority of the offenders were of a white ethnicity (see chart 8.4). Influence of alcohol or drugs seemed to be important in driving this form of violence. This was reported as the most common motive (see chart 8.2), and almost three fifths of the victims (see chart 8.6) were under the influence of drugs or alcohol when the crime was committed, which was higher than for any other type. About half of the cases in the *Public No Weapon* type took place during the day (55.5%) and the majority of cases (82.1%) was single instances of violence (see chart 8.6).

None of the cases in *Public No Weapon* type included offenders who used a weapon against the victim (see chart 8.9). The most commonly reported injuries were bruises (45.8%) and cuts (18.2%), while the most commonly reported form of violence was the victim being punched (73.5%) and grabbed (36.4%) (see charts 8.8 and 8.7). All of the violent crimes in the *Public No Weapon* type were committed in a public place (see chart 8.3) and most were committed by strangers (64.1%) with another fifth being committed by someone just known to the victim by sight (see chart 8.1). Compared to the other types, there was a higher percentage of strangers in the *Public No Weapon* type.

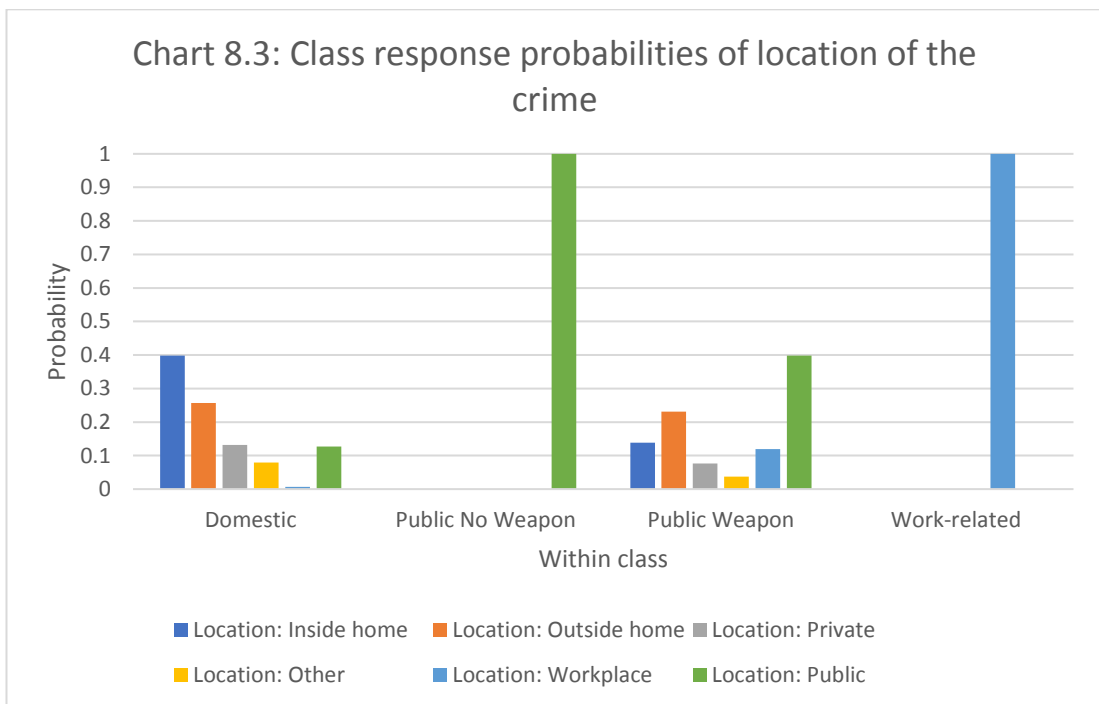
Overall, this would suggest a type of predominately male, young offenders being under the influence of alcohol committing violence in a public setting. The victim and offenders were most commonly not known to each other and the violence was motivated by the fact that the offender was under the influence of alcohol or drugs. None of the cases in the *Public No Weapon* type involved the use of a weapon, and the injuries and violence tended to be less severe in this type. A higher percentage of both victims and offenders were under the influence of drugs and alcohol in this type compared to the other three types.



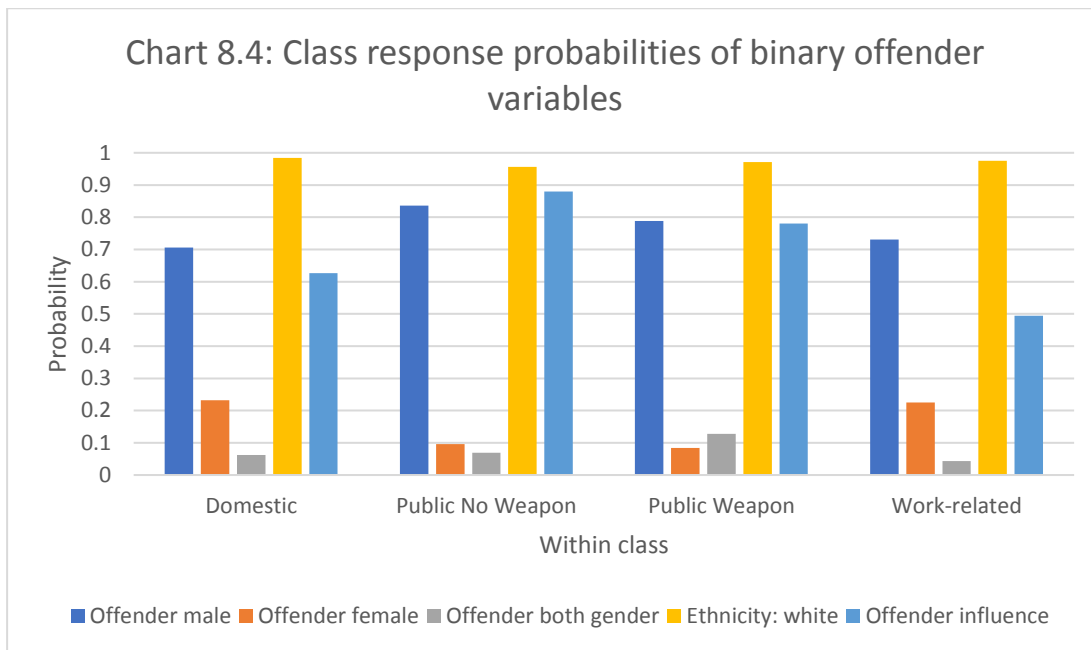
Note 1: Source: SCJS pooled dataset. Base: n=2097



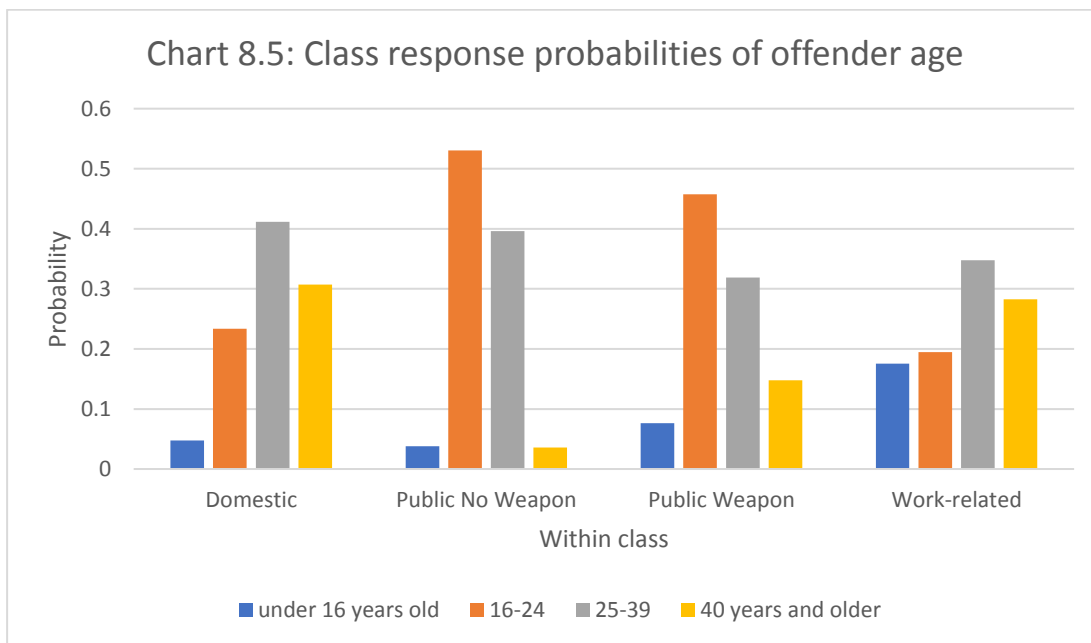
Note 1: Source: SCJS pooled dataset. Base: n=2097



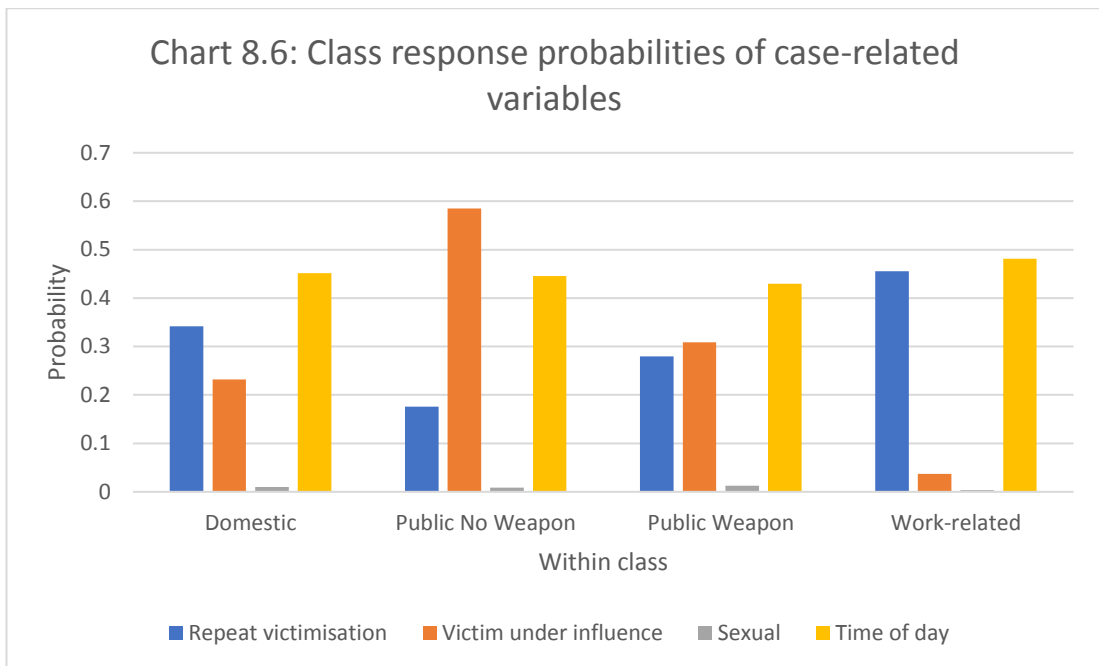
Note 1: Source: SCJS pooled dataset. Base: n=2097



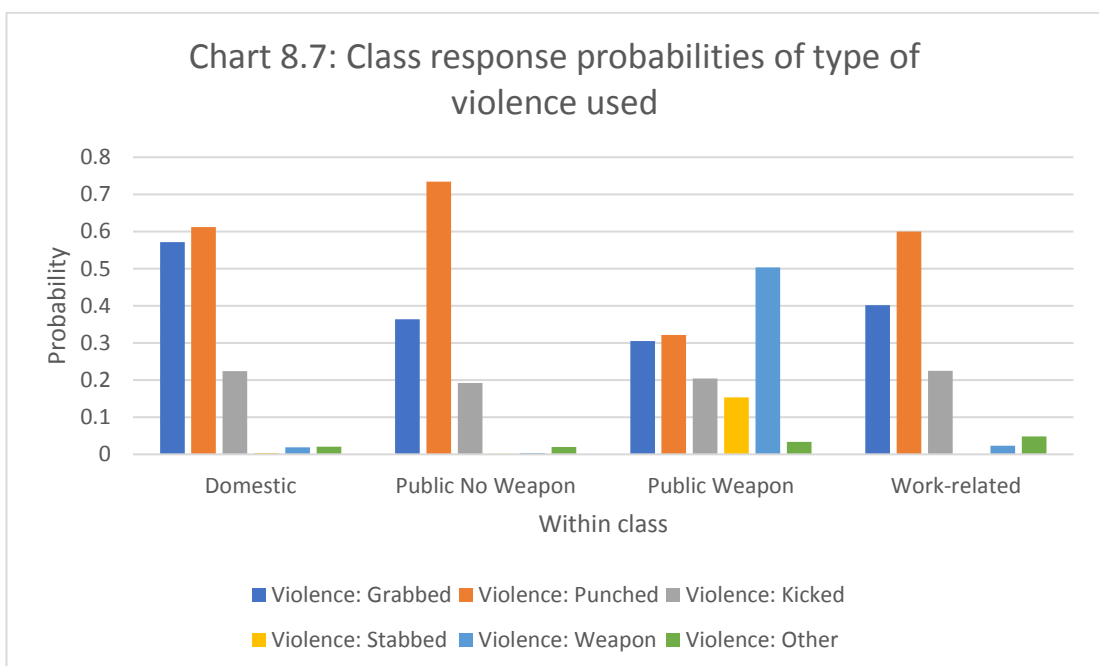
Note 1: Source: SCJS pooled dataset. Base: n=2097



Note 1: Source: SCJS pooled dataset. Base: n=2097



Note 1: Source: SCJS pooled dataset. Base: n=2097



Note 1: Source: SCJS pooled dataset. Base: n=2097

8.3.2.3 Public Weapon type

The *Public Weapon* type (24.0%, n=503) was very similar to the *Public No Weapon* type (see above) with the exception of weapon use. The *Public Weapon* type was characterised by a majority of white, male offenders who were mostly under the influence of drugs or alcohol (see chart 8.4). This type was rather young, with almost

half of the offenders (46.8%) being 16-24 years old (see chart 8.5). This type also had the highest proportion of both female and male offenders (12.8%) (see chart 8.4).

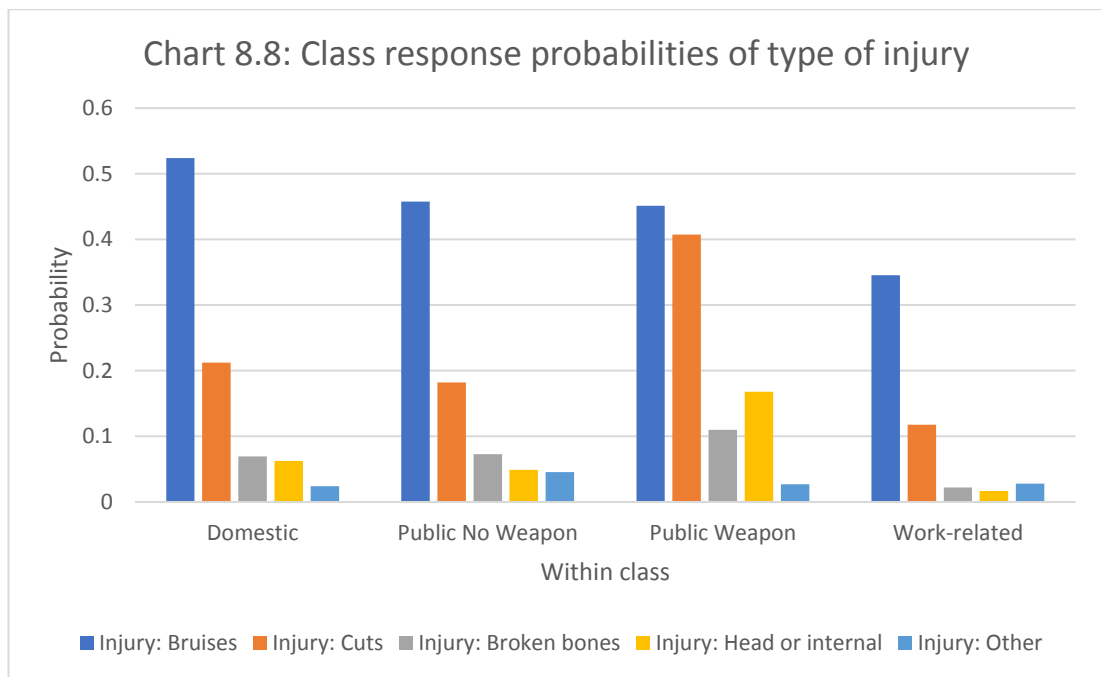
The victim was under the influence of alcohol or drugs in about a third of the cases in the *Public Weapon* type and the crime was part of a series of crimes against the victim in about another third of the cases (see chart 8.6). Most of these crimes took place during the day (morning/afternoon). As can be seen from chart 8.6, very few of the cases overall included sexual victimisation. However, out of the four types, the *Public Weapon* type included the highest percentage of cases including a sexual element (1.3%).

The most commonly reported motives for the *Public Weapon* type was that the offender was under the influence of alcohol or drugs (45.5%) and that the crime was opportunist or occurred in the spur of the moment (24.9%) (see chart 8.2). The violence used by the offenders in the *Public Weapon* type was the most varied of all the types (see chart 8.7). The most common type of violence used was violence caused by a weapon (50.3%), followed by the victim being punched (32.1%). However, 15.4% of the cases in this type included stabbing, which was the highest level of this type of violence across all types. The offenders used a variety of weapons in the *Public Weapon* type, the most common being a sharp instrument (37.9%) followed by a glass or a bottle (28.0%) (see chart 8.9). As can be seen from chart 8.9, the use of a weapon was by far more common in this type compared to the other three types. The cases in the *Public Weapon* type also had a range of quite severe injuries, with 16.8% of the cases reporting head injuries, internal injuries or loss of consciousness (see chart 8.8). Overall, this type included the most severe types of injuries sustained.

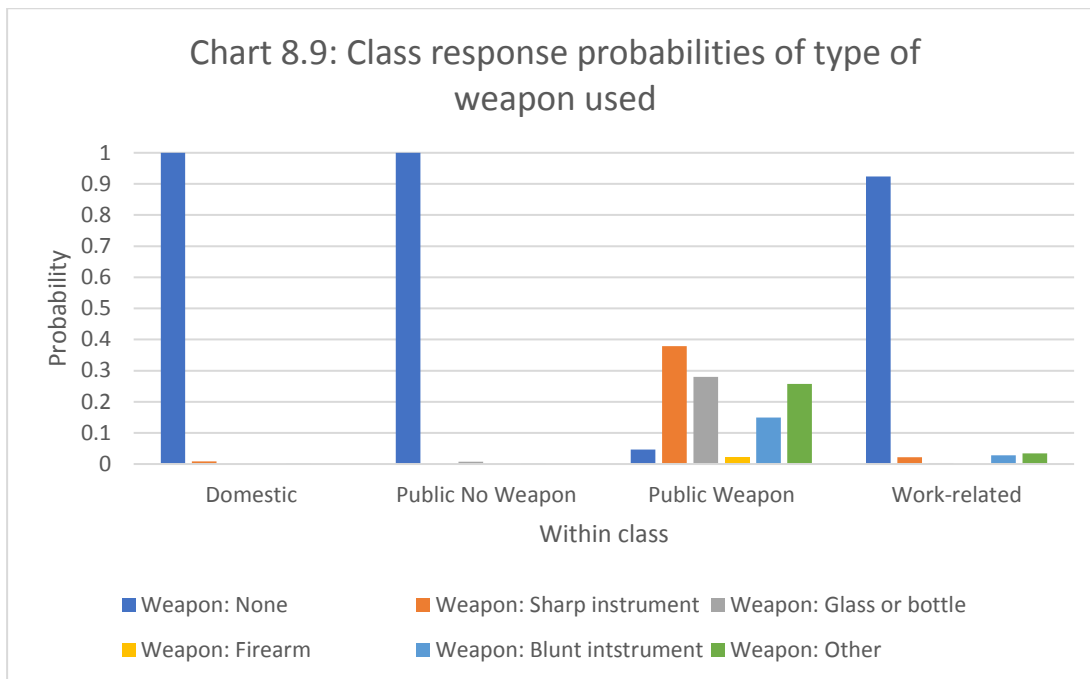
Approximately two fifths of the cases in the *Public Weapon* type were committed by strangers, with another fifth of the cases including offenders and victims who only knew each other by sight (see chart 8.1). Very few of the individuals involved in the cases in this type appeared to have a well-known relationship. Although the location where the crime took place was somewhat varied in the *Public Weapon* type, the most

common location was a public place (39.8%) (see chart 8.3). Approximately another quarter took place just outside of the home of the victim.

Overall, this analysis would suggest a type of violence that occurred in public places under the influence of drugs or alcohol and involving some sort of weapon, most commonly a sharp instrument. The injuries sustained by the victims tended to be more serious than the other three types, which could be related to the higher frequency of weapon use in this type. The offenders were mostly male and quite young, and most of them were under the influence of alcohol or drugs when the crime was committed. The influence of alcohol or drugs was also the most common motive reported by the victims of these cases. The offenders and victims of these cases tended to be strangers or people who only knew each other by sight.



Note 1: Source: SCJS pooled dataset. Base: n=2097



Note 1: Source: SCJS pooled dataset. Base: n=2097

8.3.2.4 Work-related type

The fourth class was labelled the *Work-related* type (19.2%, n=403) since all cases in this type were committed in or around the workplace of the victim (see chart 8.3). Although the most common relationship between the victim and the offender was strangers, the victim and the offender were work colleagues in about a third of the cases (see chart 8.1). The *Work-related* type was characterised by a majority of male offenders (73.1%). The most common age of the offenders was 25-39 years old (34.8%, see charts 8.4-8.5), similar to the *Domestic* type. Like the other types, most of the offenders in the *Work-related* type were white. In almost half of the cases these crimes were part of a series of incidents against the victim, which is the highest percentage of all the four types. About as many of these crimes occurred at evening/night as in the morning/afternoon (see chart 8.6).

The most commonly reported motive in the *Work-related* type was, similarly to the *Public Weapon* and *Public No Weapon* types, that the offender had been under the influence of drugs and alcohol (42.2%, see chart 8.2). The vast majority of the victims (96.3%) were however sober at the time of the crime (see chart 8.6). Another quarter of these cases was motivated by mental health problems of the offender (see chart 8.2).

The most common type of violence reported was that the offender had punched (60.0%) or grabbed (40.2%, see chart 8.7) the victim, and the most common injuries were bruising (34.5%) and cuts or scratches (11.8%, see chart 8.8). The vast majority of cases did not include any weapons (see chart 8.9).

Overall, this would indicate a type of violent incidents occurring in and around the workplace of the victim or during the course of the victims' employment. Although most of the victims did not know the offender, another third of the cases included offenders who were work colleagues of the victim. The offenders tended to be slightly older compared to previous types and were most commonly male. Most of the victims were sober, whereas the most common motive for the violence was that the offender was under the influence of drugs or alcohol, followed by mental health problems of the offender. This type of violence could therefore indicate workplace violence occurring in at-risk workplaces of the victims, such as pubs or nightclub, or types of employment that include dealing with members of the public at night, such as police officers or people working in public transport. Although about as many of these cases occurred during the daytime as during the night, this type had the highest percentage of cases committed during the night compared to the other types.

The following section will continue to describe the two between classes in the 4-2 model of violence.

8.3.3 Between (Victim) Classes

As mentioned, there were two between classes in the 4-2 model based on the characteristics of the victim (see table 8.13). The between classes were based on quite few variables compared to the within classes, and as can be seen in chart 8.10, the classes of victims were predominantly differentiated by gender.

Table 8.13: Between (victim) classes

Class number	Class name	Number	Percent (%)
Class 1	Male victim	1221	58.2%
Class 2	Female victim	876	41.8%
Total:		2097	100%

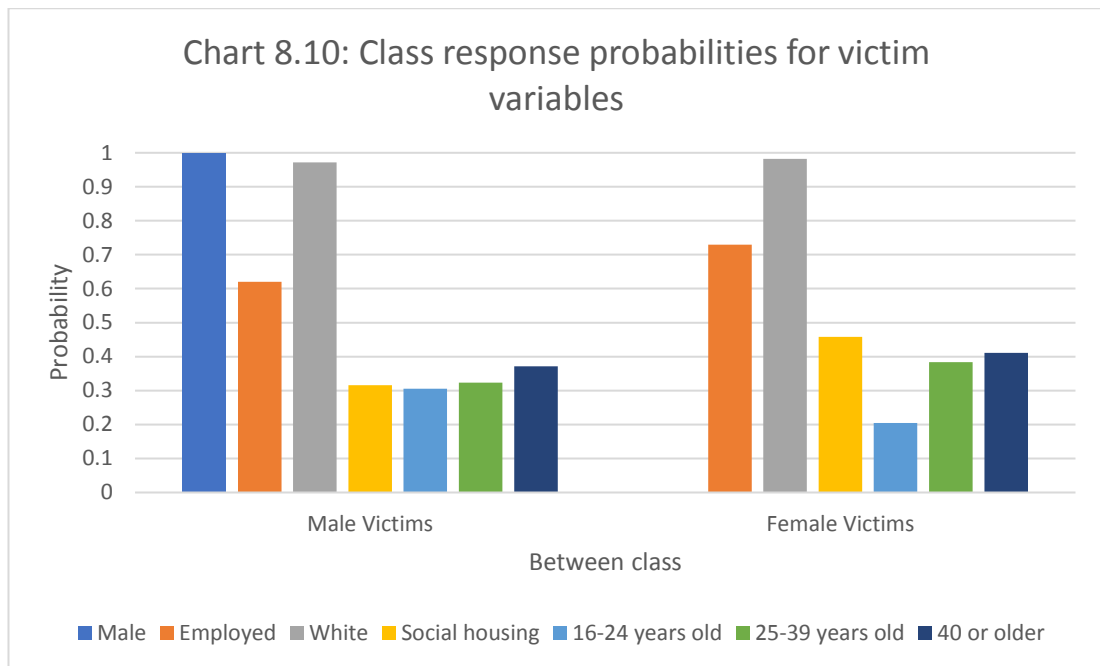
Note 1: Source: SCJS pooled dataset. Base: n=2097

8.3.3.1 Male Victim Class

The first victim class was labelled the *Male Victim* class (58.2%, n=1221), since it consisted only of male victims (see Chart 8.10). The vast majority of the victims were white and just over three fifths were employed. The age was quite evenly distributed among the *Male Victims*, with the most common age being 40 years or older (37.1%). Almost a third of the *Male Victims* resided in social housing.

8.3.3.2 Female Victim Class

The second between-level class was called *Female Victim* and consisted only of female victims (see chart 8.10). As with the *Male Victims*, the vast majority of the *Female Victims* were white. The *Female Victims* were slightly older than the *Male Victims*, with fewer victims being aged under 25 years old and 41.1% being aged 40 years or older. Almost three quarters of the *Female Victims* were employed and almost half resided in social housing, meaning that it was more likely for this class to reside in social housing compared to the *Male Victims*.



Note 1: Source: SCJS pooled dataset. Base: n=2097

The two previous sections described the within-level classes and the between-level classes of violence separately, but as mentioned, the purpose of modelling the data in this way is to examine how these two levels of classes interact. The following section will therefore describe the subtypes of violence, which are the eight possible combinations of these types and classes.

8.3.4 Subtypes of Violence

The subtypes of violence identified in this study was made up by the different combinations of the within types and between classes and therefore amounted to a total of eight (see table 8.14). These combinations are important since they represent patterns in the data of both victim and offender/incident characteristics, not just one or the other, and therefore makes a strong contribution to the literature on violence. For purposes of presentation, they are presented in four groups relating to their within (incident/offender) type. Each group contains two different subtypes of violence.

Table 8.14 Different subtypes of violence

Subtype:	N	Percent of Within group	Percent of all cases
1. Domestic subtypes (29.0%, n=608)			
a. Male Victim Domestic	225	37.0%	10.7%
b. Female Victim Domestic	383	63.0%	18.3%
2. Public No Weapon subtypes (27.8%, n=583)			
a. Male Victim Public No Weapon	459	78.7%	21.9%
b. Female Victim Public No Weapon	124	21.3%	5.9%
3. Public Weapon subtypes (24.0%, n=503)			
a. Male Victim Public Weapon	333	66.2%	15.9%
b. Female Victim Public Weapon	170	33.8%	8.1%
4. Work-related subtypes (19.2%, n=403)			
a. Male Victim Work-related	204	50.6%	9.7%
b. Female Victim Work-related	199	49.4%	9.5%

Note 1: Source: SCJS pooled dataset. Base: n=2097

8.3.4.1 Domestic subtypes

The *Domestic* subtypes of violence (n=608, 29.0%) were part of a series in about a third of the cases, meaning that it was quite common that this offence occurred multiple times. The offender was also more likely to be under the influence of alcohol or drugs compared to the victims. The most common of the *Domestic* subtypes was the *Female Victim Domestic* subtype, constituting more than three fifths of all the *Domestic* subtypes, and 18.3% of the entire sample (see table 8.14). This was a domestic type of violence taking place by a relatively young male offender who most commonly was the intimate partner of the female victim. Most of this violence took place inside the home of the victim, and weapons were very seldom used in the assault.

The *Male Victim Domestic* subtype of violence was characterised by male on male violence between current or previous intimate partners, motivated by a personal

relationship or history between the victim and offender and occurred inside the house of the victim. The *Male Victim Domestic* subtype constituted about 40% of the *Domestic* subtypes, and about one tenth of the entire sample.

8.3.4.2 *Public No Weapon subtypes*

The most common of the *Public No Weapon* subtypes (n=583, 27.8%) was the *Male Victim Public No Weapon* subtype, constituting almost four fifths of all the *Public No Weapon* subtypes, and one fifth of the entire sample (see table 8.14). That means that the *Male Victim Public No Weapon* subtype was the most common violence subtype in the current study. The *Male Victim Public No Weapon* subtype was characterised by male on male violence in a public place without the use of weapons, where the offender was relatively young. The majority of the crimes in this subtype was motivated by the fact that the offender was intoxicated. This subtype of violence was most commonly committed between strangers or individuals who only knew each other by sight.

The *Female Victim Public No Weapon* subtype was considerably less common in comparison to the *Male Victim Public No Weapon* subtype, constituting approximately a fifth of the *Public No Weapon* subtypes. This was also the least common subtype of the entire sample (5.9%). This subtype of violence was a public type of violence involving no weapons, typically committed by younger men against a female victim.

8.3.4.3 *Public Weapon subtypes*

The most common of the *Public Weapon* subtypes (n=503, 24.0%) was the *Male Victim Public Weapon* subtype, constituting 66.2% of the *Public Weapon* subtypes, and 15.9% of the entire sample (see table 8.14). This subtype of violence was characterised by male on male violence in a public place using some sort of weapon, most commonly a sharp instrument. The victim and offenders were most commonly strangers, or knew each other by sight, and the violence used and injuries sustained were quite severe compared to the other subtypes of violence. The most common motive for this subtype of violence was that the offender was under the influence of

either drugs or alcohol, and most of the offenders and about a third of the victims were under the influence when the crime was committed.

The *Female Victim Public Weapon* subtype constituted 8.1% of the entire sample, and about a third of the *Public Weapon* subtypes. This subtype was characterised by public violence with the use of a weapon, usually by a younger man against a female victim.

8.3.4.4 *Work-related subtypes*

The *Male Victim Work-related* subtype of violence (9.7% of the entire sample, see table 8.14) constituted about half of the *Work-related* subtypes (n=403, 19.2%) and was characterised by male on male violence occurring at the place of work of the victim, committed by either strangers or work colleagues. The victims were almost exclusively sober when this subtype of violence was committed and the offenders tended to be slightly older compared to the other subtypes of violence. Like the *Domestic* types, this subtype of violence was quite likely to be part of a series of crimes against the victim. In the majority of this subtype of violence there was no weapon used, and the injuries and violence was less severe compared to the *Public Weapon* subtypes.

The *Male Victim Work-related* subtype of violence was about as common as the *Female Victim Work-related* subtype of violence (9.5% of the entire sample, 49.4% of the *Work-related* type), suggesting that men and women are equally likely to be victims of violence at the work place. This subtype was characterised by relatively older male offenders committing violence against female victims, in or around the workplace of the victim or during the course of employment. The following section will discuss these results.

8.4 Discussion

Although previous research and statistics have shown that violence in Scotland is falling, and has been falling for some time (see Chapter 2), little was known about whether all types of violence were decreasing at the same rate. The findings of this chapter demonstrate that there indeed are different types of violent crimes in Scotland.

Using the SCJS, four major types of violence were identified (*Domestic; Public no Weapon; Public Weapon, and Work-related*), representing latent patterns in the violence data, with two separate types of victims in each type (*Male victims and Female victims*). Although this might not be an exhaustive typology of all the different types of violence that might exist in Scotland, it is the first step towards identifying those types.

Of the four main types of violence identified, the *Public No Weapon* type and the *Public Weapon* type were the most similar, differing only in terms of the use of a weapon in the latter type. Both of these types most commonly involved young male offenders and young male victims who typically did not know each other. The violent act was usually motivated by the fact that the offender was under the influence of drugs or alcohol and the crimes took place in a public setting. But, as discussed, there were some distinct differences between these two types as well. The use of alcohol among victims seemed to be more prevalent in the *Public No Weapon* type and the victim and offender were more commonly strangers in the *Public No Weapon* type compared to the *Public Weapon* type. Additionally, the use of a weapon did have an important impact on the violence itself. The injuries sustained by the victims in the *Public Weapon* type were considerably more severe compared to the *Public No Weapon* type, which further highlights the difference between these two types of violence.

The *Public No Weapon* type bears some resemblance to the ‘Violence in pursuit of non-social profit-based goals’ type identified in England by McMurrin et al., (2009). Both the *Public No Weapon* type and the type identified by McMurrin et al., (2009) were committed by young men against other men, motivated by the fact that the offender was under the influence of alcohol, were opportunistic in nature and rarely involved the use of weapons. Similarly, the *Public Weapon* type identified in the current study were similar to the ‘Violence as defence as response to a threat’ type identified by McMurrin et al. in that both types also were committed by young men against men under the influence of alcohol, but often included the use of a weapon. Although the types identified by McMurrin et al. did not mention the locus of violence, there are some stark similarities between the findings of the studies. The *Public*

Weapon type furthermore bear some resemblance to a type identified by Soothill, Francis and Fligelstone (2002) called 'General Violence' in that both types involved young men committing violence with the use of a weapon.

The *Domestic* type of violence were typically committed by the intimate partner of the victim inside the home of victim. The offender was most commonly male and the victim was most commonly female, although it is worthy to note that the victim was male in nearly two fifths of the cases. This type of violence has been well-defined in previous research as well as in policy initiatives from the Scottish Government. The prevention of domestic violence and violence against women, including sexual violence, is one of two main policy foci to prevent and reduce violence in Scotland alongside action against violence more generally, which has a specific focus on youth violence and knife crime (Scottish Government, 2012; 2017a; 2017d; 2017e, see Chapter 3). Additionally, there is a myriad of domestic violence typologies identified in the literature to which the *Domestic* type identified in the current research bear strong resemblance (see for instance Cavanagh & Gelles, 2005; Messinger et al., 2014; Holtzworth-Munroe, 2000; Johnson, 2006). Many of these typologies however tend to focus on the offender or on psychological variables, which the current study did not include. Nevertheless, the *Domestic* type of violence identified in the current study bear strong resemblance to most domestic types identified in previous studies.

The *Work-related* violent type constituted about a fifth of the sample and was reported to be repeated instances of violence in almost half of these crimes. The victims of this type of violence were almost exclusively sober and the victim was as likely to be female as male. About two fifths of these cases included victims who did not know their offender, which could suggest that the victims were attacked by a member of the public while at work. Another third of this type included victims and offenders who were work colleagues, which might suggest quite a different pattern of victimisation in this group. The fact that the most common types of motives in this group was that the offender was under the influence of drugs or alcohol or mental health problems of the offender might indicate that this type of violence is related to particularly risky workplace environments or types of employment of the victims, such as bouncers,

care-takers, or nurses. The fact that as many of the victims were female as male suggests that this particular type of violence was similar across gender.

Similarities to the *Work-related* type identified in the current study can be found in the types of work-place violence identified by Mayhew and Chappell (2001). Mayhew and Chappell identified three different types of occupational violence; External (committed by individuals outside of the organisation), Client-initiated (initiated by the clients or customers) and Internal (violence between co-workers or colleagues). Fragments of all three of these types can be found in the *Work-related* types of violence in the current study. Although the most common relationship between the offender and victim in the *Work-related* types was stranger, which would make these types similar to the External and Client-initiated types of violence, about a third of the *Work-related* cases were committed by work colleagues.

Overall, that means that previous research has identified types of violence that resemble all four major types of violence identified in the current thesis, which further underlines the validity of the violence types found here. The typology of violence identified in the current study is however more detailed and distinct compared to previous typologies of violence. This is most likely due to the wide range of variables and characteristics used to identify the types of violence in the current study which therefore provides a more comprehensive and accurate description of the data. Other research which has examined types of violence tend to focus on the frequency of the violence rather than the characteristics (see for instance Norris et al., 2014). Although frequency was partially measured in this study with the inclusion of the binary variable 'repeat victimisation' (see table 8.9), the main focus of the typology was the more detailed characteristics of the violent act. This arguably led to a more detailed typology of violence than any previous violence typology to date, which may be more useful for policy purposes. Although the four types of violence identified in the current study might not necessary represent an exhaustive representation of all types of violence in Scotland, these four types are more detailed and distinct than any previous typology and help to provide a deeper understanding of violence in Scotland over time. Not only does this research show that there are different types of violence in Scotland with clear,

distinguishing patterns, but also, as the next Chapter will show, that these types have changed differently over time.

8.5 Chapter conclusions

This chapter has provided an answer for the second research question (see Chapter 3, section 3.5), arguing that there are different types of violence identified in Scotland. Four major types of violent crimes were identified (*Domestic; Public No Weapon; Public Weapon; and Work-related*), related to two different classes of victims (*Male victims and Female victims*), resulting in eight different combinations of subtypes of violence. Although similarities between the types identified in the current study and types in previous research have been found, this chapter has argued, as with the homicide typology, that the violence typology identified here constitutes a more detailed and distinct typology of violence than has previously been identified. Both the homicide typology and the violence typology therefore adds to the literature on homicide and violence.

This chapter and the previous chapter have together provided answers for two of the five research questions of the thesis. A typology of homicide has been identified as well as a typology of violence, and what remains is to examine how each of these typologies have changed over time, before they will be compared. The next Chapter will therefore examine three things: firstly, how the types of the homicide typology have changed over time. Secondly, how the violence types have changed over time. And finally, how does the change in homicide subtypes reflect the overall change in violence subtypes, if at all?

Chapter 9: Comparison of Homicide and Violence Typologies

9.1 Introduction

The previous three chapters examined homicide and violence in Scotland by identifying a homicide typology and a violence typology respectively, answering the first and the second research questions of this thesis (see Chapter 3, section 3.5). This Chapter will provide an answer to the three remaining research questions:

- 3) How has the mix of homicide subtypes changed over time?
- 4) How has the mix of violence subtypes changed over time?
- 5) How does the change in homicide subtypes reflect the overall change in violence subtypes, if at all?

This will be done by examining the change in the homicide typology and the violence typology, respectively. It will be argued that, although all homicide types have demonstrated an absolute decrease over time, the types have decreased at different rates. While the *Stabbing* and *No Weapon-Bludgeoning* homicides have remained relatively stable over time, the *Rivalry* homicides demonstrated a significant decrease and the *Femicide* homicides have increased relatively over time. It will also be argued that the violence types have demonstrated different trends over time. Firstly, like the homicide types, there has been an absolute decrease in all violence types. However, this has not been even across the violence types. The *Work-related* and the *Domestic* types of violence have demonstrated a relative increase over time, meaning that the absolute, overall decrease has been mainly driven by the decrease in the *Public Weapon* type of violence.

The homicide and violence typologies will then be compared in order to examine whether the change in homicide subtypes can be said to be reflective of the changes in violence subtypes. It will be argued that, despite differences in the underlying datasets, similar types of homicide and violence has been identified and the overall trend in all these types does follow a similar downward pattern over time in Scotland. However, differences in the rate of decline within each typology means that the relative

proportion of different types of both homicide and violence has shifted. Overall, this means that both lethal and non-lethal violence among young men committed with the use of sharp instruments in public places have decreased in relative terms, homicide and violence committed in domestic settings have become relatively more common over time.

These findings will then be discussed in relation to international trends in homicide and violence. The chapter will however begin with an examination of how the types of the homicide typology identified in Chapter 7 have changed over time.

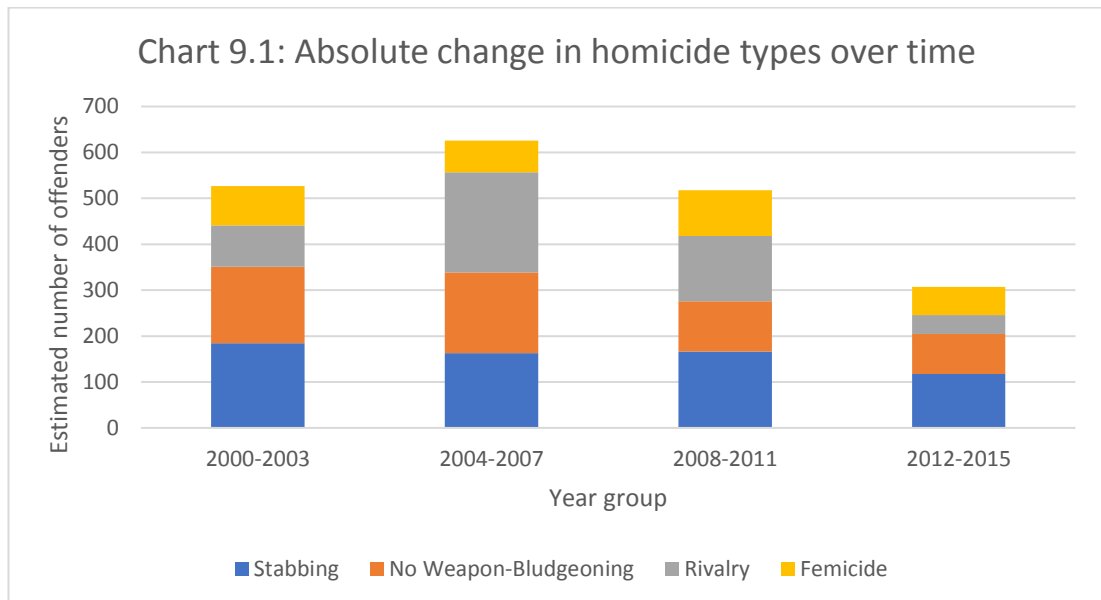
9.2 Change over time in homicide typology

In order to examine the change in the homicide types over time, the year in which the homicide was committed was introduced on the between level of the model as a series of binary covariates (see Chapter 5, section 5.3.1). Due to the small number of cases in some years, the years were combined into four-year groups from 2000 to 2015 (see table 7.2). In order to examine how each between type had changed over time, two measures were calculated based on the individual probabilities in the model; an estimated number of offenders per year group and the average probability for each type per year-group. The estimated number of offenders per year group was plotted against time to examine the absolute change in the homicide types, and the average probability for each type per year group was plotted against time to examine the relative change of the homicide types.

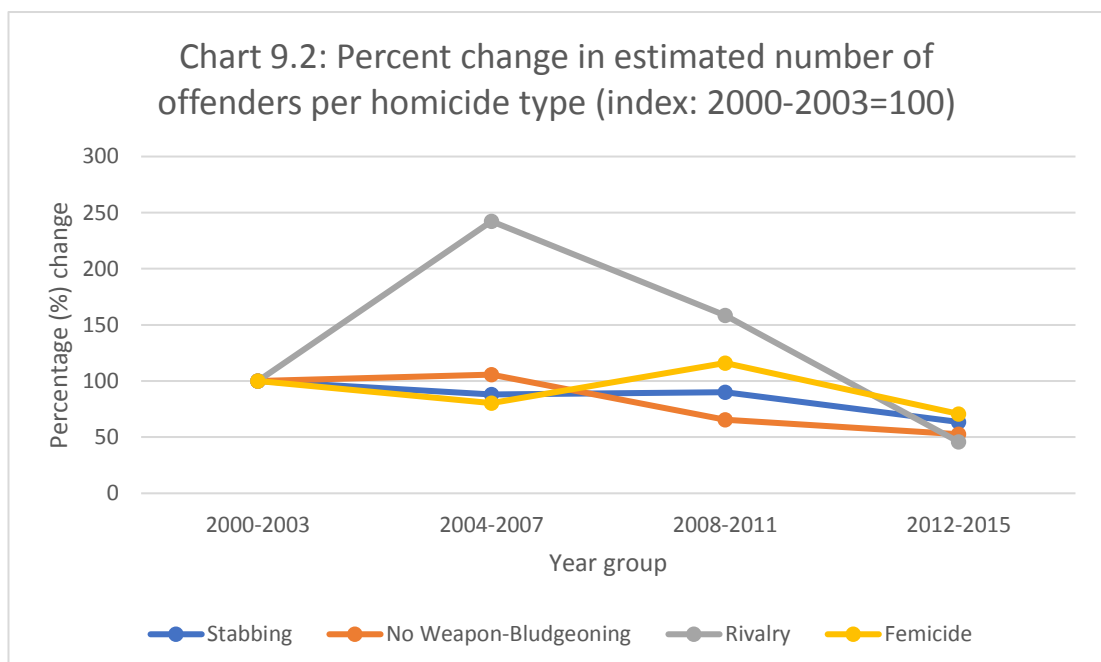
9.2.1 Absolute change over time

Chart 9.1 demonstrates the estimated number of offenders in each type in each year-group, and chart 9.2 demonstrates these figures indexed at the first year-group (2000-2003). As can be seen from chart 9.1 and 9.2, all types of homicide demonstrated an absolute decrease over time. The *Stabbing* homicides decreased by approximately 36% in 2012-2015 compared to 2000-2003, and the *No Weapon-Bludgeoning* type had almost halved over the same time period. The *Rivalry* homicides demonstrated a sharp increase of 142% between 2000-2003 and 2004-2007, but this was followed by an equally marked decrease from 2004-2007 onwards, leading to an overall decrease of

54% in 2012-2015 compared to 2000-2003 (see chart 9.2). The *Rivalry* homicides consequently demonstrated the largest absolute decrease over time. After an initial increase in the *Femicides*, this type also decreased by 29% in 2012-2015 compared to 2000-2003. Of all the homicide types, the Femicide demonstrated the smallest absolute decrease over time (see charts 9.1-9.2).



Note 1: Source: SHD. Base: n=1978

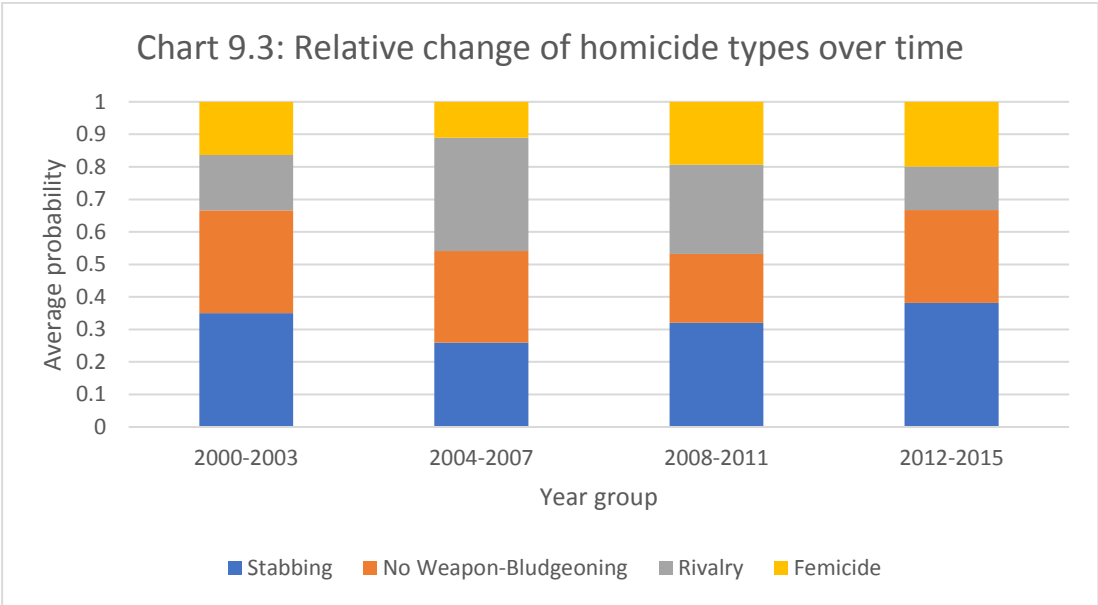


Note 1: Source: SHD. Base: n=1978

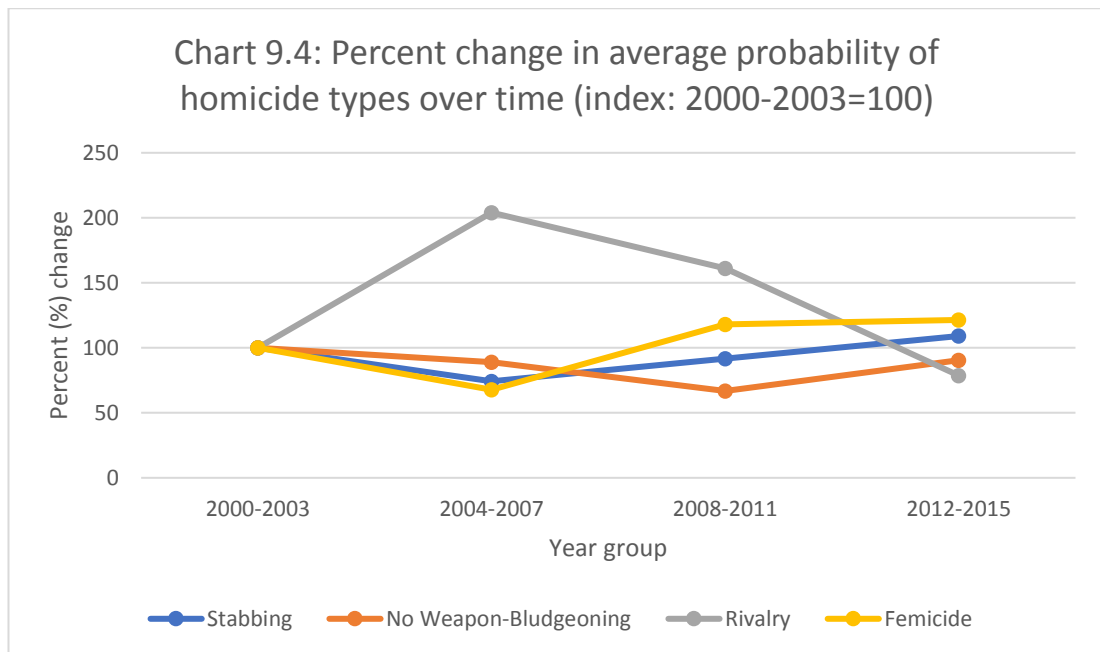
Overall, this means that all homicide types have demonstrated a decrease in absolute terms over time. However, this is not the whole story. Even though all types have demonstrated an absolute decrease when the estimated number of offenders per year was examined, this does not provide any information about how the types have changed in relation to each other. Have all types decreased equally over time, or are some types changing differently in comparison to the other types?

9.2.2 Relative change over time

In order to examine the relative change of the homicide types over time, the average probability for each type per year-group was calculated and plotted out against time (see charts 9.3-9.4 and table 9.1). This reveals the proportion of all homicide made up by each type and how this proportion has changed over time. The mean probabilities were subsequently indexed at the first year in order to examine the change in each type of homicide relative to the other types over time. Mann Whitney U-tests for each class were subsequently performed in order to examine whether this change over time was statistically significant (see table 9.1). Effect sizes are reported in Appendix 9.1.



Note 1: Source: SHD. Base: n=1978



Note 1: Source: SHD. Base: n=1978.

When the relative change in homicide types were examined over time it was revealed that the types had not changed similarly (see charts 9.3-9.4). Two of the types (*Stabbing* and *No Weapon-Bludgeoning*) remained relatively stable over time. The *Stabbing* type demonstrated a relative decrease between 2000-2003 and 2004-2007, but then increased again between 2004-2007 and 2012-2015. Both of these relative changes were statistically significant (see table 9.1). This means that in 2012-2015, this type of homicide demonstrated figures very close to the 2000-2003 figure, and can therefore be said to demonstrate a relatively stable trend over time. Similarly, the *No Weapon-Bludgeoning* type demonstrated a significant relative decrease between 2000-2003 and 2004-2007, as well as between 2004-2007 and 2008-2011. However, between 2008-2011 and 2012-2015 this type increased significantly, to around its original level of 2000-2003. Additionally, these two types remained the most common types of homicide over time (see chart 9.3). Taken together, despite absolute decreases in these two types, the *Stabbing* homicides and the *No Weapon-Bludgeoning* homicides remained relatively quite stable over time.

The *Rivalry* homicides demonstrated a marked, significant increase between 2000-2003 and 2004-2007 relative to the other types of homicide (see charts 9.3-9.4, and table 9.1). As can be seen from chart 9.4, the mean probability of belonging to this

type increased by 104% between 2000-2003 and 2004-2007. The *Rivalry* homicides however subsequently demonstrated an equally marked decrease relative to the other types. In 2012-2015, this type of homicide had decreased by 21.3% compared to 2000-2003, making it the least common type of homicide in this year group compare to the other types. This decrease also proved to be statistically significant (see table 9.1).

Table 9.1: P-values of Mann Whitney U-tests of relative change in homicide types over time

Type of homicide	2000-2003 vs 2004-2007	2000-2003 vs 2008-2011	2000-2003 vs 2012-2015	2004-2007 vs 2008-2011	2004-2007 vs 2012-2015	2008-2011 vs 2012-2015
Stabbing	(-) 0.014	0.513	0.285	0.128	(+) 0.002	0.142
No weapon-bludgeoning	0.053	(-) 0.001	0.904	(-) 0.001	0.133	(+) 0.001
Rivalry	(+) 0.001	(+) 0.026	(-) 0.001	(-) 0.001	(-) 0.001	(-) 0.001
Femicide	(-) 0.009	0.106	0.213	(+) 0.001	(+) 0.001	0.883

Note 1: Source: SHD. Base: n=1978.

Note 2: p-values in bold indicates significance

Note 3: The signs before the p-values demonstrate increase (+) or decrease (-) in the trend.

The relative change of the *Femicides*, however, demonstrates a slightly more complex trend. Similarly to the *Stabbing* type, the *Femicides* decreased significantly by 32.3% between 2000-2003 and 2004-2007 relative to the other types. This decrease was however followed by a significant increase between 2004-2007 and 2008-2012, as well as a significant increase between 2004-2007 and 2012-2015 (see charts 9.3-9.4, and table 9.1). In 2012-2015, this type had actually increased by 21.3% compared to 2000-2003, becoming more common in 2012-2015 than the *Rivalry* homicides. Although this increase did not prove statistically significant, in 2012-15 the *Femicides* had become the most common type of homicide. Overall, the *Femicides* had therefore demonstrated a relative increase over time. All the effect sizes of these tests were however small or very small (see Appendix 9.1). The following section will discuss these findings.

9.2.3 Discussion of change in homicide typology

Overall, these results would suggest that although there has been an absolute decrease in homicide, some homicide types have reduced more than others over time. While the proportion of all cases that are representative of *Stabbing* homicides and *No Weapon-Bludgeoning* homicides have remained relatively stable over time, the proportion of cases that are *Rivalry* homicides has decreased significantly over time. This would suggest that the overall contribution of the *Rivalry* homicides has been the greatest in respect to the overall drop in homicide. Additionally, the *Femicides*, which demonstrated the smallest absolute decrease over time, have demonstrated a relative increase in share over time, which was significant between 2004-2007 and 2012-2015. As a result, in 2012-2015, *Femicide* was the most common type of homicide in Scotland. Although increases in domestic violence overall tend to be explained as increases in reporting of this crime (Scottish Government, 2015a; Tonry, 2014), it is unlikely in this case since these findings relate to domestic homicides. It is therefore likely that the relative increase observed here has been caused by a greater reduction in other forms of homicide compared to domestic cases. Thus, the overall decrease in homicide that has been evident over the past decade is mainly driven by a decrease in public, feud-motivated homicides involving young men and sharp instruments whereas domestic homicides have not decreased by anything near as much.

As mentioned, the Scottish Government implemented numerous initiatives to combat this precise type of public violence over the past ten to fifteen years, with programmes such as the No Knives Better Lives (NKBL, 2014) and the Violence Reduction Unit (Scottish Government, 2012). Although this study cannot demonstrate a direct effect of these initiatives it is likely, given the timing of the decline in homicide and the nature of the focus of these initiatives, that they did have an impact on the homicide decline. A decrease in this type of homicide is of course good news. Particularly so due to the cyclic nature of this violence; one act of rivalry homicide is likely to lead to an equal retaliatory act, meaning that a reduction of this type of homicide is breaking this cycle. However, this means that although all homicides in Scotland have decreased over time, some types of homicide, such as for instance the *Femicide* type, have not decreased by nearly as much. Although it is out of the scope of the current study to

examine the efficiency of any policy initiatives, the results would suggest that the factors affecting the decrease of the trends in *Rivalry* homicides, has not affected the other forms of homicide identified in this research with the same level of success. This suggests that any interventions that have been put in place to prevent homicide are likely to have had the greatest effect on public homicides involving sharp instruments and motivated by feuds and faction rivalry (the *Rivalry* types); however, they may have been less likely to have an effect on domestic homicides and homicides occurring mainly indoors in private settings, either by sharp instruments or by physical assault. Although the Scottish Government has policy in place to combat domestic violence and violence against women (Scottish Government 2015a; 2015b; 2016b), perhaps slightly different prevention strategies are needed to further decrease the *Femicides* at the same rate as the *Rivalry* homicides. Additionally, it would generally seem that homicides occurring inside in private locations are harder to prevent. Perhaps we might therefore require different prevention strategies with a specific focus on multiagency collaborations in response to private or residential homicides, similar to what has been done for public violence (VRU, 2016; 2017) especially since the majority of the homicides in the current study occurred inside in private locations.

Overall, the findings in the current study would suggest that there are distinct types of homicides in Scotland and that these homicides have changed at different rates over time. Although some homicides, namely the *Rivalry* homicides, have decreased significantly over the examined time period, domestic types of homicide (the *Femicides*) have demonstrated a relative increase. The pattern of homicide in Scotland has consequently changed and the prevention strategies should follow suit. Even though one type of homicide has decreased, other types of homicides have remained stable or increased in relative terms, and different policy strategies might be necessary in order to prevent all types of homicide equally. This will be discussed further in Chapter 10.

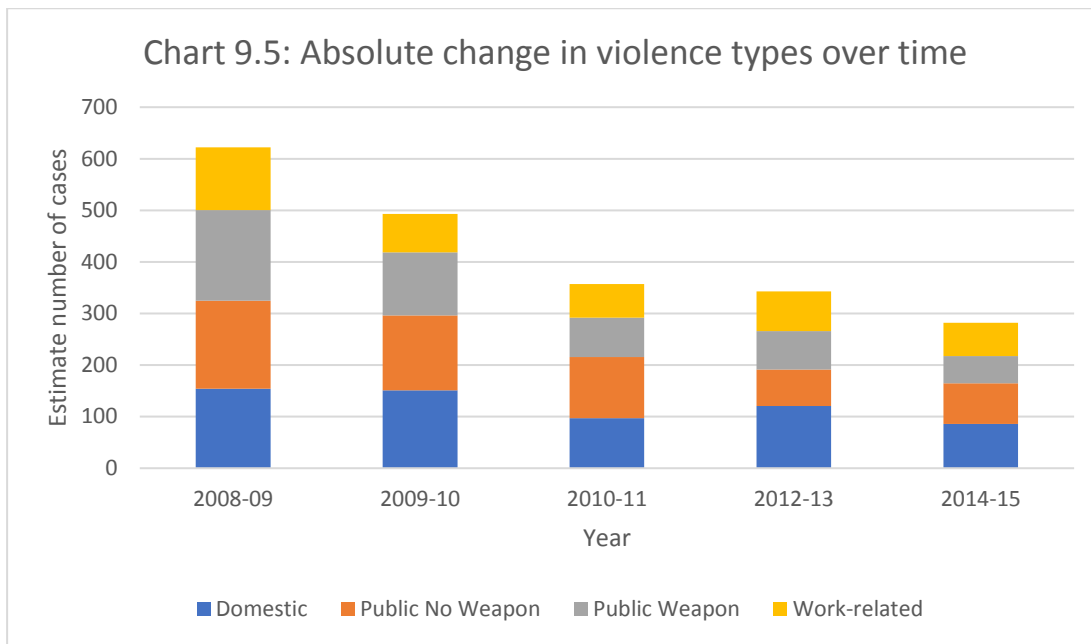
The following section will examine the change in the violence typology over time, in order to compare these two typologies in section 9.4.

9.3 Change over time in violence typology

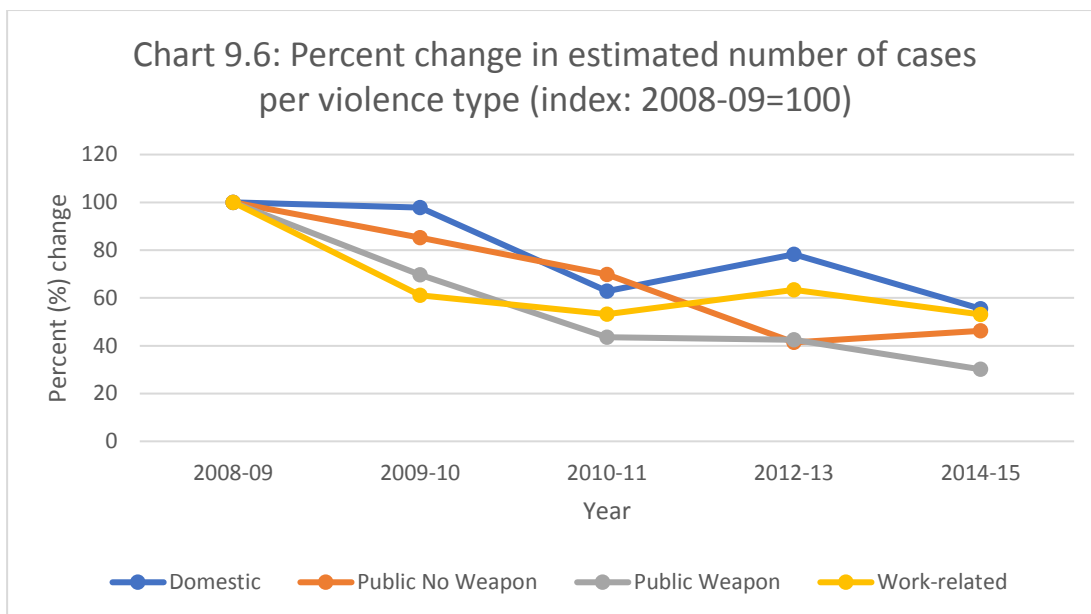
As mentioned in the introduction, this Chapter also aimed to examine how the violence typology has changed over time. In order to examine change in the violence subtypes over time, time as measured by the year of the survey sweeps, was introduced on the within level of the model as a series of binary covariates (see Chapter 5, section 5.3.2). In order to examine how each type had changed over time, two measures were calculated based on the individual probabilities in the model; an estimated number of cases per year group and the average probability for each type per year. The estimated number of cases per year group was plotted against time to examine the absolute change in the violence types, and the average probability for each type per year were plotted against time to examine the relative change of the violence types.

9.3.1 Absolute change over time

As can be seen from charts 9.5-9.6, all types of violence demonstrated an absolute decrease over time. The *Public No Weapon* type of violence more than halved between 2008-09 and 2014-15, and the *Public Weapon* type decreased by 70% over the same time period (see chart 9.6). This means that the *Public Weapon* type demonstrated the largest absolute decrease over time. Although both the *Work-related* type and the *Domestic* type both decreased, the decrease in these two crimes appeared less steep. The *Domestic* type of violence decreased by 44% and the *Work-related* type decreased by 47%. This means that the *Domestic* type of violence demonstrated the smallest absolute decrease over time.



Note 1: Source: SCJS pooled dataset. Base: n=2097



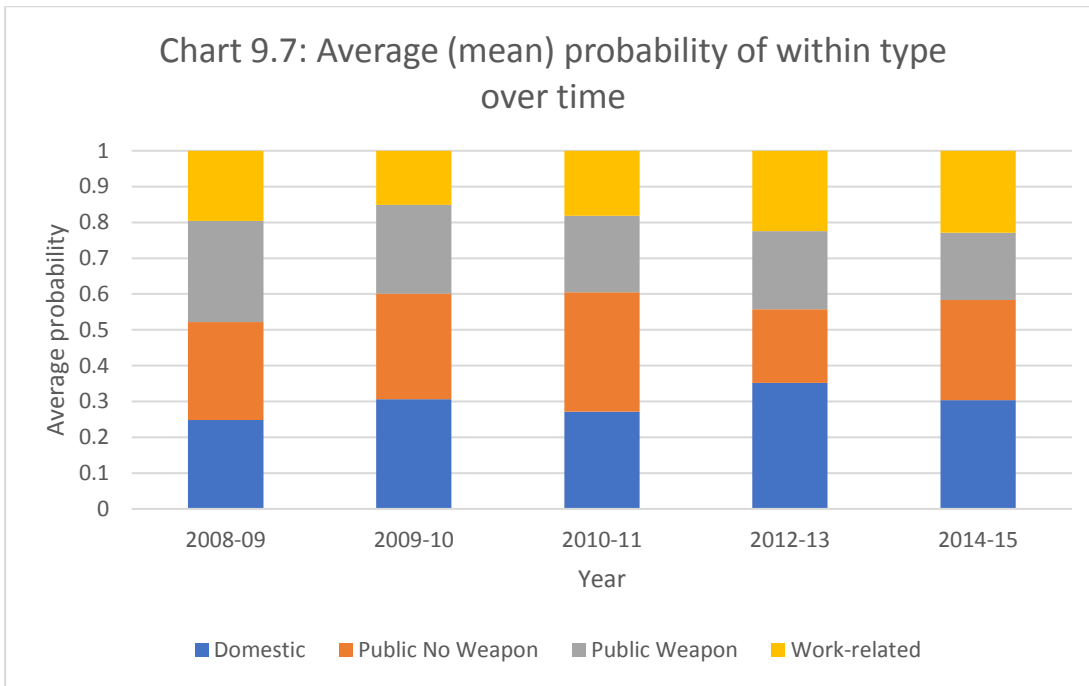
Note 1: Source: SCJS pooled dataset. Base: n=2097

Although there was an absolute decrease in all types of violence, they did not decrease at equal rates, which means that the proportion of some violence types is likely to have increased over time. In other words, certain types of violence may have become more common than others. In order to examine this, the relative change of the violence subtypes was examined as well.

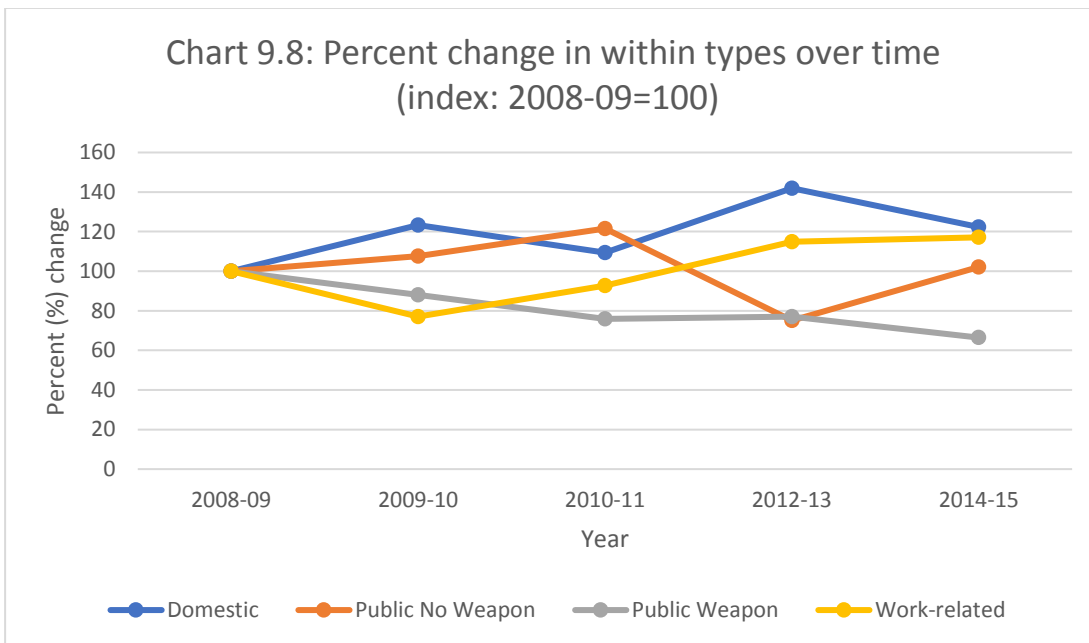
9.3.2 Relative change over time

When the relative change in violence was examined, as can be seen from charts 9.7-9.8, the relative contribution of each type of violence changed over time. One type demonstrated no change (*Public No Weapon*), two types demonstrated an increase (*Work-related* and *Domestic*) and one type of violence demonstrated a decrease (*Public Weapon*). Although demonstrating a slight significant decrease between 2009-10 and 2012-13, as well as between 2010-11 and 2012-13, the relative share of the *Public No Weapon* type returned to its original level in 2014-15, only showing a 2% increase from 2008-09. The relative proportion of the *Public No Weapon* type has arguably therefore remained stable over time in Scotland even if the type has declined in absolute terms (see charts 9.7-9.8 and table 9.2). As can be seen from chart 9.7, this type remained the second most common type of violence over time.

Mann Whitney U-tests for each class were subsequently performed in order to examine whether this change over time was statistically significant (see table 9.2). Effect sizes are reported in Appendix 9.2. The *Public Weapon* type was the only type that demonstrated a consistent relative decrease over time (see charts 9.7-9.8 and table 9.2). Although some of the changes from year to year were not significant, the relative share of this type of violence decreased by 34% in 2014-15 compared to 2008-09, becoming the least common type of violence in 2014-15. This decrease proved to be statically significant (see table 9.2). This type of violence went from being the most common type of violence in 2008-09 to being the least common type of violence in 2014-15 (see chart 9.7).



Note 1: Source: SCJS pooled dataset. Base: n=2097



Note 1: Source: SCJS pooled dataset. Base: n=2097

Table 9.2: P-values of Mann Whitney U-tests of relative change in violence types over time

Type of violence	2008-09 vs 2009-10	2008-09 vs 2010-11	2008-09 vs 2012-13	2008-09 vs 2014-15
Domestic	0.088	(+) 0.001	(+) 0.006	(+) 0.008
Public No Weapon	0.363	0.264	(-) 0.051	0.778
Public Weapon	0.103	0.130	(-) 0.015	(-) 0.001
Work-related	(-) 0.021	0.196	0.526	(+) 0.026
	2009-10 vs 2010-11	2009-10 vs 2012-13	2009-10 vs 2014-15	-
Domestic	(-) 0.016	0.236	0.273	-
Public No Weapon	0.856	(-) 0.008	0.623	-
Public Weapon	0.955	0.369	(-) 0.011	-
Work-related	0.431	(+) 0.011	(+) 0.001	-
	2010-11 vs 2012-13	2010-11 vs 2014-15		
Domestic	0.347	0.409	-	-
Public No Weapon	(-) 0.003	0.370	-	-
Public Weapon	0.360	(-) 0.010	-	-
Work-related	0.084	(+) 0.002	-	-
	2012-13 vs 2014-15			
Domestic	0.990	-	-	-
Public No Weapon	(+) 0.043	-	-	-
Public Weapon	0.107	-	-	-
Work-related	0.148	-	-	-

Note 1: Source: SCJS pooled dataset. Base: n=2097

Note 2: p-values in bold indicates significance

Note 3: The signs before the p-values demonstrate increase (+) or decrease (-) in the trend.

Both the *Domestic* type and the *Work-related* types demonstrated an increase in relative share of all violence over time (see charts 9.7-9.8 and table 9.2). Although the *Work-related* type demonstrated an initial significant decrease between 2008-09 and 2009-10, the share of this type of violence increased by 17% in 2014-15 compared to 2008-09, an increase that proved statistically significant. The *Domestic* type also demonstrated a relative increase over time. By 2014-15 this type of violence had increased significantly by 22% compared to 2008-09, making the *Domestic* type of violence the type with the largest relative increase over time. As can be seen from chart 9.7, both of these types had also changed their relative position in comparison to the other types over time. The *Domestic* type was the third most common type of violence in 2008-09, but in 2014-15, it had become the most common type. The *Work-related* type moved up from least common to the second least common type of violence between 2008-09 and 2014-15. The effect size for all tests were however very small (see Appendix 9.2). The next section will discuss these results before the two typologies (homicide and violence) will be compared over time.

9.3.3 Discussion of change in the violence typology

Overall, these results suggest that although there has been an absolute decrease in all types of violence, different violence types have changed differently over time. Public violence involving weapons (the *Public Weapon* type) were significantly less common in the later years of the study while violence occurring in domestic settings mainly between current or previous intimate partners (the *Domestic* type) as well as violence occurring in relation to the victim's workplace (the *Work-related* type) had become relatively more common. The *Public Weapon* type had decreased by 34% in 2014-15 compared to 2008-09 while the *Domestic* type had increased by 22% in relative terms, and the *Work-related* type had increased by 17% in relative terms over this time. This means that the most severe type of violence, with the highest proportion of serious injuries and weapon use, has shown a marked decrease compared to the other types of violence over the years. This however also means that both domestic violence and violence occurring at the workplace has become more common over time compared to other types of violence.

Although decrease of any type of violence is good news, especially relatively severe types of violence, this apparent difference in decrease over time between the different types of violence needs to be examined further. The more prominent decrease in public violence involving weapons might be related to the strong focus on preventing this particular form of violence in Scotland. As discussed earlier in relation to homicide, strategies and interventions made by the Scottish Government such as the No Knives Better Lives initiative and the various projects to reduce violence launched by the VRU are aimed at reducing all forms of violence, but have had a particular focus on public and youth violence (BSC, 2016; NKBL, 2016; VRU, 2016). Since Scotland used to be known as the ‘most violent country in the Western world’ with a reputation for having high levels of knife crime (BBC News, 2005; The Guardian, 2005), this focus of policy is perhaps not so surprising. However, the trends of violence are changing in Scotland, and with it, it would seem, the patterns and characteristics of violence as well. This means that a reshaping of the policy focus might be required in order to ensure that all the different types of violence in Scotland are tackled and prevented effectively. Although there are some strategies and interventions in place by the Scottish Government to tackle and prevent domestic abuse, perhaps more or slightly different prevention strategies are needed to further decrease this type of violence at the same rate as public violence.

It has been argued that the evident increase in domestic violence could be related to the increase in the reporting and recording of this crime, which previously tended to be vastly underreported (Blumstein, 2000). However, due to the nature of the SCJS from which the violence data is gathered, it can be expected that public violence is reported more often compared to domestic violence. This, because of the sensitive nature of this crime, is exacerbated by the fact that the interviews take place in the home of the victims (Scottish Government, 2016e). The fact that the *Domestic* type proved relatively more common in the later years than the public types of violence would suggest that the increased share of this type of violence is not due to an increase in the reporting of the crime, however, it is still important to keep in mind that a general

shift in attitudes towards domestic violence is likely to affect the reporting of this crime as well.

It is also important to acknowledge that not all victims of domestic abuse are women, and not all perpetrators of this type of crime are men. Although most of the offenders in the *Domestic* types were male, about a quarter of the offenders in this type were female. Similarly, about 40% of the victims of this type were male, although it was more common for the victims to be female. Although the new Domestic Abuse Bill (Scottish Parliament, 2017a) does not specify domestic abuse as gendered, the prevention of domestic violence is mostly covered under the Scottish Government policy strategies to prevent violence against women (Scottish Government, 2017a). As the current study indeed confirms, most victims of domestic violence are women, however, a substantial number of victims were male and it is important to acknowledge this if domestic violence is to be reduced and prevented.

Violence occurring in relation to the work environment of the victim (the *Work-related* type) had also seen a relative increase over time. Studies of work-related violence more generally have suggested that changes in work-place environments involving increased risks as well as an increased propensity to report such crime has contributed to the increased awareness on this type of violence (Estrada, Nilsson, Jerre & Wikman, 2010). Overall, the *Work-related* type indicates a type of violence that has not gained as much attention in policy strategies as other forms of violence in Scotland, and therefore merits more research and examination, especially since this type of violence appears to have increased in relative terms over time. Although the *Work-related* type of violence remains one of the less frequent types, this type still constituted about a fifth of all the violent cases reported. If this form of violence is becoming more common in Scotland it is important that an appropriate strategy is developed to tackle this particular form of violence. This research has therefore demonstrated the need of identifying subtypes of violence in Scotland in order to gain a deeper understanding of this form of crime.

Overall, this study has found that there indeed are different types of violence in Scotland that differ from each other on various variables and that they have changed differently over time. These findings would consequently suggest that it is not only the trends of violence that have changed over time, but the patterns and characteristics of violence as well. The next section will move on to answer the fifth and final research question of the thesis: How does the change in homicide subtypes reflect the overall change in violence subtypes, if at all?

9.4 Comparing the homicide typology to the violence typology

As described in the previous sections, the homicide model had a 4-3 model as a best fitting model while the violence model had a 4-2 model as the best fitting solution (see table 9.3). When comparing the typologies, it is primarily the types involving the incident variables that will be examined. Although these types are on different levels in the two typologies (the between-level of the homicide typology and on the within-level of the violence typology), they are based on as similar variables as the data would allow. The incident-levels were also easier to compare since the offender (within) classes of the homicide typology and the victim (between) classes of the violence typology are based on different variables, making comparison more difficult. Additionally, the main types involving the incident variables were of primary interest in both typologies. For these reasons, the discussion will therefore focus on the types in both typologies.

As discussed in Chapter 1, section 1.3.1, it was decided that it was worthwhile to compare the two typologies despite the underlying differences of the datasets for two main reasons: firstly, because trends in subtypes of homicide and violence has never been compared before, and secondly, because extensive measures were taken in order to maximise their comparability, including the recoding of the variables used and the modelling of the datasets. It is however important to note that the differences between the homicide dataset and the violence dataset constitutes a limitation in the current study which needs to be taken into account when interpreting these findings. In light of these differences, the types will be compared on a theoretical rather than statistical basis.

Table 9.3: Between and within types of the homicide and violence typologies

Homicide typology:	Violence Typology:
<i>Rivalry</i> (within)	<i>Public Weapon</i> (between)
<i>Femicide</i> (within)	<i>Domestic</i> (between)
<i>No Weapon-Bludgeoning</i> (within)	<i>Public No Weapon</i> (between)
<i>Stabbing</i> (within)	<i>Work-related</i> (between)
Younger Unemployed Offender (within)	Male Victim (between)
Mixed Unemployed Offender (within)	Female Victim (between)
Employed Offender (within)	
Total (n): 1978	2097

Note 1: Source: SHD and SCJS Pooled Dataset.

Note 2: Main types to be compared in italics.

When examining the main types of homicide and violence it became apparent that there were many strong similarities between the types. The *Femicide* homicide type was very similar to the *Domestic* violence type in that both types most commonly included intimate partners, they occurred indoors in private settings, and they were, to a large extent, motivated by some sort of domestic or personal dispute. The victims were most commonly female in both typologies, and although the most common weapon was a sharp instrument for the *Femicides* whereas it was no weapon in the *Domestic* type, one fifth of the *Femicide* cases included death by physical assault (see chart 7.1 in Chapter 7). This difference in the use of a weapon would however be expected when comparing homicide to violence, seeing that the use of a weapon, including knives, increases the risk of lethality (Felson & Messner, 1996; Weaver, Wittekind, Huff-Corzine, Corzine, Petee & Jarvis, 2004). Any violent attack including a sharp instrument is in other words more likely to result in the death of either person involved compared to violent acts that do not include sharp instruments. Out of all the different types in the two typologies, the *Femicide* type and the *Domestic* type were therefore the most similar and could be regarded as the same type of violence where one ended lethally (*Femicides*) and the other did not (*Domestic* violence). *Femicides* could in other words be argued to represent the extreme end of a spectrum of domestic

violence, where the use of a weapon is likely to increase the lethality of such an incident.

The *Rivalry* homicides were very similar to the *Public Weapon* violence type. Both of these types occurred outdoors in public settings, most commonly involving the use of a sharp instrument, and usually perpetrated by young, male offenders. While the *Rivalry* homicides were most commonly motivated by a feud or faction rivalry and most commonly involved rivals, the *Public Weapon* violence type was most commonly motivated by the fact that the offender was under the influence of drugs or alcohol, and most commonly occurred between strangers. However, the motive variable was not very comparable between the datasets (see Chapter 8, section 8.2.3), mostly since this variable was estimated by the victim rather than the police in the violence dataset. Both types involved public acts of violence between young men that involved the use of a knife or other sharp weapon. As discussed in the previous chapters, this type of violence has been a problematic issue for some years in Scotland (Damer, 1990; Fraser, 2015; Leyland, 2006; Scottish Government, 2012; 2017a; 2017d). It is therefore not surprising to find a type such as this within both the violence and homicide typology.

Interestingly, both the *Rivalry* type and the *Public Weapon* type involved the use of a sharp instrument even though only the *Rivalry* type ended with the death of the victim. As mentioned, the use of a weapon such as a knife has been found to increase the risk of lethality (Felson & Messner, 1996; Weaver et al., 2004), however, in these cases, both the lethal and non-lethal acts of violence involved a weapon, suggesting that the use of a weapon was not the most important factor when differentiating lethal acts of violence in these types. The biggest differences between the *Rivalry* homicides and the *Public Weapon* type were the motive ('feud' for the *Rivalry* type and 'offender under the influence of drugs or alcohol' for the *Public Weapon* type) and the relationship between offender and victim ('Rival' in the *Rivalry* type and 'Stranger' in the *Public Weapon* type). Although it is not possible to determine how much of the differences between these two types that are caused by the underlying differences of the datasets, these two variables (motive and relationship) might be related to the differentiation between lethal from non-lethal cases in these types. For instance, violence directed

towards a long-term rival in the context of a feud is more likely to be targeted and committed with intent compared to violence directed towards a stranger. The difference between a lethal and non-lethal act of violence in these types might therefore be related to the longevity of the conflict which sparks the violence, as well as the relationship between the offender and the victim.

The *No Weapon-Bludgeoning* homicide type was quite similar to the *Public No Weapon* violence type. Both types involved violent acts that most commonly did not include weapons, and both types mostly involved male offenders and victims under the influence of alcohol or drugs. While the *No Weapon-Bludgeoning* homicides were most commonly motivated by some sort of fight or conflict and the most common motive for the *Public No Weapon* violence type was that the offender was under the influence of drugs or alcohol, these two motivations may be related. As mentioned, the motive variables were slightly different in the two datasets and although 'Fight or conflict' did not exist as a possible motive in the violence data, a violent act instigated by the consumption of alcohol could have involved violent acts occurring due to a verbal fight. These two types could therefore be considered to involve similar contextual factors and circumstances where one act of violence ended lethally and the other did not.

However, there are two big differences between the *No Weapon-Bludgeoning* type and the *Public No Weapon* type. Firstly, while the *No Weapon-Bludgeoning* homicides most commonly occurred between people who knew each other, the *Public No Weapon* violence type most commonly occurred between strangers. Secondly, the *No Weapon-Bludgeoning* homicides were predominantly committed in private, indoor settings, whereas the *Public No Weapon* violence types were most commonly committed in public places outdoors. This could suggest that violence between men under the influence of drugs or alcohol that does not involve the use of weapons is more likely to end lethally if the victim and offender are known to each other and if the violence takes place in a private, indoor location. Although the relationship between the victim and the offender as well as the location of the crime has been found to be important previously when assessing lethality (Ganpat et al., 2013), this study

shows that this is also relevant in crimes that do not involve the use of a weapon. This could mean that although the presence of weapons is relevant for increasing the risk of lethality (Felson & Messner, 1996; Weaver et al., 2004), this is not always the most important factor in determining whether a serious assault will result in homicide. Whether or not the offender and victims were known to each other and whether the violence took place in a private setting seem to be important factors when examining lethality in violent acts not involving the use of a weapon.

Moreover, it was more common for all homicides to be committed in private, indoor settings compared to the violent types, which more commonly were committed in public places outdoors. This included types of violence and homicide involving the use of weapons (such as the *Public Weapon* type and *Stabbing* type). Violence in public places would tend to be stopped more often and quickly due to the presence of witnesses, CCTV or the intervention of capable guardians such as the police (Cohen & Felson, 1980; Meier & Miethe, 1993), whereas this is commonly absent in private settings. An act of violence occurring in a private setting would therefore be more likely to end lethally compared to violence occurring in a public setting.

Although other variables such as the location of the crime and the relationship between the victim and the offender are important when differentiating lethal and non-lethal events, whether or not a weapon was used still seemed to be one of the most important factors. With the exception of the *Public Weapon* violence type, all types of violence were most commonly committed without the use of a weapon. Contrastingly, all types of homicide involved the use of a weapon, including the type labelled *No Weapon-Bludgeoning*, in which a third of cases actually did involve a blunt instrument. It is therefore not so surprising that no equivalent of the *Stabbing* homicide type was found among the violence types. The *Stabbing* homicides most commonly occurred in a private, indoors setting between people who were friends or otherwise known to each other, and in which a sharp instrument was used. The most common motivation was some sort of fight or quarrel and alcohol was very commonly involved. The use of a weapon in the context of a private setting increases, as mentioned, the risk of a lethal end to the violent act. While the *Public Weapon* type of violence involved sharp

instruments and the *Domestic* violence type occurred in a private setting, none of the violence types involved both of these factors. This suggests that these two variables, the use of a weapon and a private location of the event, together greatly increases the risk of lethality in violence.

The *Work-related* violence type was characterised by violence occurring in the course of the victim’s employment, either by someone unknown to the victim or by a co-worker of the victim. The victim was almost exclusively sober when the crime was committed whereas the most common motive was that the offender was under the influence of drugs or alcohol, and most incidents of violence did not include the use of a weapon. There was no equivalent type of homicide to match the *Work-related* violence type; however, the workplace of the victim was not included as a variable in the homicide dataset. Despite this, homicide occurring at the workplace are rare in Scotland⁹⁸. Therefore, this type of violence could be said to be context specific and, although undoubtedly serious for the victims, is unlikely to be part of a spectrum of behaviour that might lead to homicide.

Table 9.4: Homicide types and corresponding violence types

Homicide typology	Violence Typology
Femicide	Domestic
No Weapon-Bludgeoning	Public No Weapon
Rivalry	Public Weapon
<i>Stabbing</i>	<i>Work-related</i>
N=1978	N=2097

Note 1: Source: SHD and SCJS Pooled Dataset.

Note 2: Italics represent types that did not correspond to any other type in the other typology.

Consequently, the types of homicide identified in this study show some similarities to the types of violence identified, but there are also important differences. The *Femicide* homicides demonstrated strong similarities to the *Domestic* violence type, and the

⁹⁸ This excludes corporate homicides which have not been included in the current study.

Rivalry homicides had many parallels with the *Public Weapon* types. The *No Weapon-Bludgeoning* homicides were quite similar to the *Public No Weapon* violence type, although the locus of the incident tended to be different. However, the *Stabbing* homicides constituted a much more serious form of behaviour in a domestic environment that did not correspond fully with any of the violence types; and the *Work-related* violence type was also very context specific and did not completely correspond to any of the homicide types (see table 9.4). It is not possible to determine the extent to which these differences are caused by variation in the variables used for the modelling as opposed to real underlying differences in the nature and level of severity of homicide cases versus violence cases. Nevertheless, as these similarities stand, it would seem that when it comes to the relationship between the characteristics of homicide and violence, types of homicide are similar to types of wider violence in Scotland. As discussed in Chapter 2, very few studies have previously examined the similarities and differences between homicide and violence to determine whether these two crimes reflect the same underlying behaviour. The findings of the study therefore adds to the wider literature on the relationship between homicide and violence by arguing that, at least in Scotland, there are similarities of some types of lethal and non-lethal violence, suggesting that these types can be interpreted along the same continuum, differing in outcome rather than process.

The next section will compare how the types in the different typologies changed over time.

9.5 Change in types over time

As mentioned in sections 9.2 and 9.3, both the homicide types and the violence types changed differently over time (see charts 9.1-9.8). As discussed in Chapter 4, the two datasets cover different time periods, so direct comparison is not entirely possible. While the homicide data spans from 2000-2015, the violence data only covers the years 2008-09 to 2014-15, and not every year is included in the SCJS sweeps. This constitutes an issue when comparing the change over time in these two typologies and in order to overcome this problem, the discussion here will primarily focus on direction of the trends rather than the magnitude of any increase or decrease. In other words, the

comparison will be in regards to whether similar types have changed in similar ways, and not in regards to how much the trends have changed (see Chapter 10 for further discussion).

As discussed in section 9.2, the relative trends in two of the homicide types remained stable over time (*Stabbing*, and *No Weapon-Bludgeoning*) whereas one type had decreased (*Rivalry*) and one type (*Femicide*) had demonstrated a relative increase over time. The *Rivalry* type showed an initial marked increase in relative terms before decreasing significantly, making it the least common type of homicide in 2012-2015. The *Femicides*, on the other hand, demonstrated a relative significant increase over time, becoming the most common type of homicide in 2012-2015. This suggests that the decrease in *Rivalry* homicides had the greatest impact on the overall decline in homicide in Scotland. While there has been an absolute decrease in homicide overall, there has also been a relative increase in the *Femicide* homicides over time.

The violence types demonstrated very similar trends over time as the homicide types. As discussed in section 9.3, all types demonstrated an absolute decrease over time. In relative terms, two of the types however demonstrated an increase over time (the *Domestic* type and the *Work-related* type), whereas one type (the *Public No Weapon* type) remained stable and one type (the *Public Weapon* type) demonstrated a relative decrease. Overall, this indicates that while public acts of violence and homicide involving sharp instruments has decreased, lethal and non-lethal domestic violence has become relatively more common compared to other types of lethal and non-lethal violence in Scotland over time.

When comparing the change in trends between homicide types and violence types there is substantial similarity. In regards to both homicide and violence, public acts of violence by predominantly young men with the use of sharp instruments (the *Rivalry* homicides and *Public Weapon* type, respectively) were the only types to demonstrate a significant decrease in relative share over time. In regards to homicide, this decrease has been evident since 2004-2007, and for violence this decrease has been evident since the first year of measurement, 2008-09, although it is possible that the drop

predates this time. This would suggest that the trends in this particular form of violence have followed a similar pattern, over a broadly similar time-span, in terms of both homicide incidents and wider cases of violence.

Furthermore, both the *Femicide* homicides and the *Domestic* violence type have demonstrated a significant increase in terms of their relative share of all homicide and violence over time (see charts 9.4 and 9.8). This means that while there has been a substantial decrease of public acts of violence and homicide committed with sharp instruments by young men, the proportion of both lethal and non-lethal violence in Scotland that is domestic has increased over time. In regards to homicide, this relative increase has been evident since 2004-2007, and in the violence data, domestic violence has increased in relative terms since 2010-11.

Similarly, the *No Weapon-Bludgeoning* homicide type and the *Public No Weapon* violence type both remained stable over time in relative terms. Both types demonstrated statistically significant fluctuations in trends, but in the final years of each respective datasets, both types also returned to relative proportions very similar to their original levels. This suggests that lethal as well as non-lethal violence among men under the influence of alcohol which do not involve the use of a weapon has remained approximately as common over time compared to other types of homicide and violence.

However, some of the trends display slightly different patterns between the typologies. While the *Stabbing* homicide type also had remained relatively stable over time, the relative share of the *Work-related* violence type increased significantly over time, a trend evident since 2009-10 in the violence data. This means that while the *Femicide* homicides was the only homicide type to have increased relative to other homicide types over time, there were two types of violence which had demonstrated relative increases over time (*Domestic* and *Work-related*).

Overall, this would suggest that when the change in homicide types are compared to the change in violence types, homicide and violence appear to follow similar patterns

over time. The absolute decrease evident in both homicide and violence seems to be driven primarily by a decrease in public displays of violence between young men, predominantly involving weapons, and often involving some form of conflict or feuding rivalry. However, both homicide and violence have seen a relative increase in the proportion of cases which reflect domestic violence occurring in private settings between intimate partners. Lethal and non-lethal acts of alcohol-fuelled violence between men without the use of weapons have remained stable in relative terms in both datasets. Consequently, when it comes to the relationship between the trends in homicide and violence, homicide and violence are demonstrating very similar patterns over time, where the biggest decline seems to be driven by similar types of public, knife-related violence among young men and with similar relative increases in domestic violence. This means that while all types of lethal and non-lethal violence have decreased in absolute terms, the relative proportion of some types, namely lethal and non-lethal domestic violence and non-lethal work-related violence, have increased, making them proportionally more common over time.

The following section will explore how this finding compares with previous research on the relationship between trends in homicide and trends in violence over time.

9.6 The Scottish Story: Comparison with international studies

As discussed in Chapter 2, little prior research has been conducted into the relationship between trends in homicide and wider violence in society. Furthermore, the studies that have examined this relationship have reached very inconsistent results. Although most countries have seen a decrease in homicide since the early 1990s (Aebi & Linde, 2010) the trends in non-lethal violence seem to differ between countries (Tonry, 2014). But differences in the relationship between homicide and violence can be found even within the same country. For instance, both Blumstein (2000) and Harris et al., (2002) compared trends in homicide and violence over time in the U.S, and while Blumstein (2000) found that homicide and violence followed a similar pattern over time, Harris et al., (2002) found that while homicide was decreasing, violence was increasing. Similarly, both Aebi and Linde (2010) and Van Wilsem (2004) compared trends in homicide and violence in Western Europe, with contrasting results. As discussed in

Chapter 2, the differences in these findings could be related to different methodologies and use of different data sources when comparing the two crimes. For instance, most studies that find that homicide and violence are following a similar pattern over time tend to use victimisation data to measure violence (Blumstein, 2000; Van Wilsem, 2004). Contrastingly, the studies that have found that homicide and violence do not follow a similar pattern over time tend to use police recorded data to measure violence (Aebi & Linde, 2010; Harris et al., 2002).

But there is more at play here than just the choice of data source. These studies make the assumption that homicide and violence are homogenous constructs where firstly, all types of homicide or violence are the same, and secondly, that types of homicide and types of violence do not overlap with each other. However, previous studies, (Blumstein, 2000; Kubrin, 2003; Kubrin & Wadsworth, 2003; Lehti, 2014; Mares, 2010; Tapscott, Hancock & Hoaken, 2012; Thompson, 2015), and indeed the previous chapters of the current thesis, have demonstrated the heterogeneity of both homicide and violence. As argued in Chapter 2, if the relationship between homicide and violence is to be fully understood, it is necessary to firstly understand how many different types of both homicide and violence that can be identified; secondly, to examine how these types of homicide differ from types of violence; and thirdly to examine how these types have changed over time. No other study has previously examined how different types of homicide relate to different types of violence over time, and perhaps this is one of the reasons why the findings from previous studies about the relationship between homicide and violence are so contradictory. As the results of this research show, the relationship between the trends in homicide and violence becomes clearer when both crimes are disaggregated into subtypes. While there has been a substantial decrease in public acts of both homicide and violence committed by young men involving sharp instruments, there has been a relative increase in work-place violence and a relative increase in both lethal and non-lethal domestic violence over time in Scotland.

Although no previous study has compared trends in subtypes of these two crime types before, the results from the current study can be compared to studies using

victimisation measures of violence (such as Bloomstein, 2000 and Van Wilsem, 2004) since the violence in the current study was measured using the SCJS. As mentioned, these previous studies have found that homicide and violence do seem to follow a similar pattern over time, and that both types of crime are decreasing. Although that is accurate in the current study since all types of homicide and violence have demonstrated an absolute decline, the picture, as mentioned, appears more complicated. The findings of the current study therefore underscore the importance of disaggregation when examining homicide and violence, especially when change over time is examined. Neither homicide nor violence is adequately measured by unidimensional constructs. As shown in the current study, while the overall picture might be one of decline, the share of certain types of homicide and violence are increasing relative to other types. Information such as this is necessary when trying to prevent homicide and violence and vital if all types of homicide and violence are to be prevented equally. It is also important to examine different types of homicide and violence if the long-term impact of interventions is to be fully understood. If certain types of violence and homicide have demonstrated relative increases while others have decreased, this might indicate that the interventions and prevention strategies in place do not prevent all types of violence equally. The next Chapter will therefore discuss implications of these findings for policy as well as theory.

9.7 Chapter conclusions

This chapter has provided answers for the third, fourth and fifth research questions regarding how the homicide typology has changed over time, how the violence typology has changed over time and whether trends in homicide and violence are following a similar pattern over time. The results showed that although all types of homicide have demonstrated an absolute decrease over time, the proportion of homicide types has changed. There has been a relative, significant decrease of public, feud-motivated homicides between young men involving sharp instruments over time while homicides involving stabbings or physical assault occurring mainly indoors have remained stable. At the same time, domestic types of homicides have demonstrated a relative increase over time. Similarly, the results also showed that although there has been an absolute decrease in all violent types, violence involving the use of weapons

occurring in public places have demonstrated a relative, significant decrease over time while domestic types of violence, mainly involving intimate partners, and work-related violence have increased over time compared to other types of violence. The change in both of these typologies have been discussed in relation to policy and it has been argued that different policy strategies might be necessary in order to prevent all types of lethal and non-lethal violence equally.

As the results also have shown, the characteristics of homicide and violence are very similar, and the trends in homicide and violence do follow a similar pattern over time, but this pattern is not just one of decline in relative terms. While lethal and non-lethal violence between young men in public places with the use of sharp instruments have decreased, domestic violence as well as domestic homicides have demonstrated relative increases over time. These findings have also been discussed in relation to international trends of homicide and violence and the results have demonstrated the importance of disaggregating homicide and violence into subtypes in order to really understand this crime.

Having provided answers to all five research questions, the final chapter will discuss the implications of this research, and the limitations of the current study as well as directions for future research. The next chapter will also provide an overall summary of the findings and draw together the conclusions of the current study.

Chapter 10: Implications of Research and Conclusions

10.1 Introduction

Almost 30 years ago, a gap in knowledge about the relationship between homicide and violence was identified (Harries, 1989). Yet, very few studies have examined this relationship since then. Scotland furthermore has an overall lack of research regarding homicide and violence, despite the great decrease this country has seen in lethal and non-lethal violence over the past decade. As argued in Chapter 2, this lack of knowledge is particularly prominent in two aspects of this relationship: the similarities and differences between characteristics of homicide and violence; and the similarities and differences between the change in these two crimes over time. This lack of knowledge is furthermore problematic for a number of reasons. Firstly, homicide and violence have profound implications regarding stress placed on emergency systems, as well as the health of the family and community (Harries, 1989) and a lacking knowledge about homicide and violence means that the exact impact these crimes have on society is unknown. Secondly, any policy intervention aimed at reducing lethal and non-lethal violence, as well as any evaluation of such policy, is less likely to be efficient and reliable since this requires a deeper understanding of the characteristics and patterns of homicide and violence. Thirdly, any theoretical claims involving homicide and violence needs to be based on a full understanding of the characteristics, changes and relationship between these two crimes.

In light of this lack of knowledge, four major objectives to provide a deeper understanding of the relationship between homicide and violence in Scotland over time were outlined in this study: firstly, to examine the characteristics of homicide and violence in order to identify similar types of these crimes, based on variables relating to the victim, offender and incident. Secondly, to analyse the changing pattern in both homicide and violence trends by examining how the identified types of lethal and non-lethal violence have changed over time. Thirdly, to compare the identified types of homicide and violence in order to establish whether there are any similarities between lethal and non-lethal types. Finally, the fourth objective was to examine whether the types of lethal and non-lethal violence have changed similarly over time. With these

four objectives in mind, the aim of the current thesis was therefore to examine the changing characteristics and patterns of homicide in Scotland and to determine the extent to which changes in homicide reflect the changing characteristics and patterns in wider violence. To fulfil this aim, the following research questions was posed:

- 1) What subtypes of homicide with similar characteristics can be identified?
- 2) What subtypes of wider violence with similar characteristics can be identified?
- 3) How has the mix of homicide subtypes changed over time?
- 4) How has the mix of violence subtypes changed over time?
- 5) How does the change in homicide subtypes reflect the overall change in violence subtypes, if at all?

Having presented the results of the current study over the past four chapters, providing answers to the five research questions posed in the beginning of this thesis, this final chapter examines the implications of the findings on policy as well as theory, and draws together and summarises these results to provide a conclusion of the thesis. It will be argued that the policy response that emerged in the mid-2000s, which framed violence as a public health problem, is likely to have contributed to the subsequent decline in public homicide and violence evident in Scotland. However, it has only done so with reference to specific types of violent crime, while other areas of violent behaviour have received relatively little or insufficient attention. The results will also be discussed in relation to different theoretical frameworks, including the privatisation of violence and the connection between masculinities and violence. This Chapter will also discuss the limitations of the findings and possible future directions for research. The Chapter and the thesis will then end with a section outlining a final conclusion and summary.

The chapter will begin with a discussion of the impact of previous and current violence policy, as well as the implications of the current findings on future policies and interventions.

10.2 Implications of the findings

10.2.1 Policy implications and impact

It was not within the scope of the current study to evaluate the effects of different policies in Scotland. However, it is possible to draw together the key findings of this research with observations about the key legislative and policy changes and various interventions and strategies aimed at tackling and reducing violence that were implemented in Scotland over the period which this study covers. For example, it is unlikely to be coincidental that the vast decrease in homicide and violence occurred at the same time as multiple interventions aimed at reducing knife violence and violence among young people were introduced in the mid-2000s. While the ‘crack-down’ approach of the 1990s, including initiatives such as ‘Operation Spotlight’ (Orr, 1998:106), seemed to coincide with an increase of violent crime, the interventions put in place by the Scottish Government in the early 2000s, such as work done by the Violence Reduction Unit (VRU, 2016) and the No Knives Better Lives (NKBL, 2016) initiative, were put in place just around the time that homicide and violence began to decrease. The Violence Reduction Unit framed violence as a public health problem, advocating early prevention strategies and multi-agency collaboration to reduce violence (VRU, 2016; 2017). This meant teaming up with agencies in the field of health, education and social work in order to link violence to other problematic areas of deprivation, such as unemployment or homelessness, examining the causes of crime and encouraging a ‘bigger picture’ response to violence (VRU, 2017; 2016). As the findings of this study has shown, the overall decrease in homicide and violence seems to have been driven by a decrease in public violence among young men involving sharp instruments, which is exactly the type of violence these strategies and interventions tried to prevent. Although this is not proof that these interventions were successful, there is enough overlap in the interventions put in place at this time and the subsequent decline to assume that there at least is some relationship between the two. Both the *Rivalry* homicide type and the *Public Weapon* violence type were the least common type of homicide and violence in the final year of examination and both these types demonstrated a significant decrease over time. Since homicide is currently at a record low in Scotland, this would suggest that the current holistic, multi-agency approach to violence, framing violence as a public health problem advocated by

current violence policies in Scotland, have been beneficial in reducing and preventing violence, especially public violence involving sharp instruments.

However, as the findings of the current study also show, domestic forms of both homicide and violence have demonstrated a relative increase over time, despite the numerous policy interventions put in place to reduce this form of violence. Although there was an absolute decrease in both the *Femicide* homicides and the *Domestic* violence type, the significant relative increase in both of these types is worrying. The findings show that both lethal as well as non-lethal domestic violence have become more common over time compared to other forms of homicide and violence, suggesting that the interventions and policies put in place have had a more limited impact on preventing this type of violence. The main policy strategy aimed at reducing domestic violence, the Equally Safe strategy (Scottish Government 2016b) focuses on all forms of violence against women, including domestic, sexual and honour-based violence, linking violence against women and girls to deep-rooted issues of inequality and prioritises preventative strategies as well as multi-agency and multi-sector responses to combat this type of violence. This includes interventions such as rolling out Multi-Agency Tasking and Co-ordinating Groups (MATAC) by Police Scotland, which target serious and serial domestic offenders, as well as the development of public health guidance to support the implementation of the Equally Safe strategy within the NHS and to provide funding to train Independent Domestic Abuse Advisers (IDAAs) to provide support for high-risk domestic abuse survivors to help them navigate the legal system (Scottish Government, 2016b; 2017g).

Although most of these interventions and policies have been introduced more recently compared to the policies aimed at knife violence, meaning that there could be a lagged effect yet to be seen, there has still been a relative increase of this type of violence and homicide in recent years, suggesting that it is going in the opposite direction from what was intended. Preventing any type of homicide and violence occurring in private settings is however notoriously difficult since it involves state intervention in private life. Changing the attitudes and mindsets of people who are committing domestic

violence is therefore very important, as the Equally Safe strategy points out (Scottish Government, 2016b).

As the findings of the current study shows, most of the *Femicide* homicides and the *Domestic* assaults also took place within the context of alcohol consumption (see Chapter 7 and Chapter 8). Perhaps another way of preventing this type of violence in the future, and indeed many other types of violence and homicide as well, is to tackle the alcohol problem in Scotland. Over-consumption of alcohol is a major health problem in Scotland and has been for some time (Scottish Government, 2009a; 2017a). Although there is a framework put in place to reduce harmful alcohol consumption in Scotland (Scottish Government, 2009a) and reports show that alcohol consumption among young people has declined since 2002 (Scottish Government, 2015d), there is still a long way to go. Since the problem of alcohol is known to affect the poorest communities the hardest (Scottish Government, 2009a) this issue is especially important for the reduction of violence. This, since there are also known connections between marginalisation and violence (Polk, 1994;1999). It is therefore more than likely that lethal as well as non-lethal violence will decrease if harmful alcohol consumption is decreased as well. Strategies aimed at reducing alcohol consumption at home and not just in public, such as minimum unit pricing, are therefore also likely to reduce domestic violence.

Overall, it is important to keep a holistic approach when trying to reduce domestic violence and homicide. Although strategies aimed at reducing alcohol consumption or programmes such as the Caledonian System might help reduce and prevent domestic violence, it is unlikely that any one intervention strategy will help turn the relatively increasing trend. Similar to the strategies put in place to prevent public violence, a collaborative, multi-agency approach is necessary if this type of violence is to be reduced. For instance, due to the hidden nature of domestic violence it is important to work collaboratively with organisations in health which might identify cases which do not come to the attention of the police (Carnochan, 2015). Although the victims of such violence might not report it, training medical staff to identify these victims,

including dentists and even veterinaries⁹⁹, will increase the chances of the crime being reported as well as prevent such violence in the future. It is therefore important that policies aimed to reduce such violence reflect these collaborative interventions. Although there are some collaborative interventions in place such as the implementation of the MATAC groups and the establishment of the Violence against Women and Girls Joint Strategic board (Scottish Government, 2016b), perhaps this is not enough. The processes of policy development and implementation have previously been criticised in Scotland for reinforcing gendered and social hierarchies (Hearn & McKie, 2010). By failing to actively gender the representation of the problem as well as reinforcing a demarcation between the public and the private, the response to this gendered violence risks becoming individualised and a-gendered, framing the problem as one of ‘atypical men’ (Hearn & McKie, 2010:149). The current study also found that approximately two fifths of all victims of domestic violence were men, adding another aspect to the problem of domestic violence. Violence between intimate partners is not limited to violence against women. It is important not to exclude male victims of domestic violence. As described in the Equally Safe strategy, lethal and non-lethal violence is related to deep-rooted issues of inequality in society, and attempts of changing these issues will take time as well as resources. It is however important to keep trying to prevent and reduce this form of violence if all types of violence, and not just the most visible types of violence, are to be reduced equally.

The current policies on reducing violence in Scotland include all acts of violence. There is consequently no policy aimed at preventing or reducing homicide specifically. The findings of the current study would suggest that while some types were identified as unique to either homicide or violence (such as the *Stabbing* homicide type and the *Work-related* violence type), there are strong similarities between most of the types of both homicide and violence. The *Femicide* homicide type and the *Domestic* violence types were for instance almost identical, the *Rivalry* homicide type and the *Public Weapon* violence type shared many similarities and the *No Weapon-Bludgeoning* homicides were similar to the violent acts in the *Public No Weapon* violence type. This

⁹⁹ Veterinaries are important since it has been found that perpetrators of domestic violence sometimes hurt the victims’ pets in order to hurt the victim (VRU, 2017).

would suggest that, although there were sufficient differences found in this study to highlight what factors might escalate a violent incident into an act of homicide, homicide indeed can be considered the extreme end of a violence spectrum in these cases, much in line with previous research (Brookman & Maguire, 2003; Fajnzylber, Lederman & Loayza, 2002; Harries, 1989; Harris et al., 2002; Sampson, Raudenbusch & Earls, 1997; Van Wilsem, 2004; Zimring, 1968). Although this could imply that no specific policy to prevent homicide might be necessary in Scotland, there might be a need for introducing some specific interventions in regards to the *Stabbing* homicide type, which did not correspond to any non-lethal types. As described in Chapter 7, the *Stabbing* homicide type was most commonly committed in a private setting between men who knew each other with the use of a sharp instrument. As the findings have also shown, the use of a weapon, whether the violent act took place in a private setting and whether or not the offender and victim knew each other, were all variables that increased the risk of lethality and in the *Stabbing* homicide type, all three of these factors coincide. This could potentially mean that this type of homicide will be very hard to prevent. Not only did this type of homicide occur in a private setting where policing is generally very difficult, but the act of violence was also often improvised and related to the consumption of alcohol. This means this type of homicide most likely occur in the spur of the moment, making this type of lethal violence very difficult to predict. Nonetheless, it would be beneficial to attempt to develop policy strategies aimed specifically at trying to reduce violence lethality in order to prevent these types of homicide in the future.

The *Work-related* violence type might also require specific policy interventions. To date, the Scottish Government has no official policy strategy aimed at reducing this specific form of violence. Instead, the *Work-related* type of violence would be covered within the broader framework of reducing general violence which is mostly focused on public violence and knife crime. However, since the *Work-related* type of violence has quite specific and unique characteristics, a targeted intervention strategy focusing on violence taking place in the course of the victim's employment might be necessary. This might include implementing more rigorous safety structures around certain at risk employment groups (such as people working at bars, at night-time transport services

or in law enforcement) or increasing support for people who are being victimised by colleagues or co-workers. The *Work-related* type of violence also demonstrated a significant relative increase over time, and it is therefore important that this type of violence is recognised and prevented.

As discussed in Chapter 2, one of the main policy implications of homicide following a similar pattern to violence over time is that the trends in homicide could be used as a barometer in wider violence. Since homicide can be regarded as a much more robust and reliable indicator of violence within a society in comparison to other violent crimes (UNODC, 2013; Polk, 1994; Van Dijk, et al., 2007), the changing profile of violence in Scotland could be monitored using homicide data and the planning of resources and initiatives to prevent further violence (much of which does not come to the attention of the police) could be done more efficiently. As the current study has shown, the trends in similar types of homicide and violence do follow a similar pattern over time, which has several important implications for Police Scotland and other crime prevention organisations. Firstly, this means that the change in different types of homicide could be monitored to provide an estimate of the change in similar types of violence. This is perhaps most relevant in the case of lethal and non-lethal domestic violence which otherwise could be very hard to estimate and monitor due to the large dark figure of this crime. Secondly, since homicide can be considered the extreme end of the same violence spectrum, it can also be assumed that interventions aimed to reduce a certain type of homicide will help reduce similar types of violence. As discussed, interventions aimed at reducing public violence involving sharp instruments seems to have led to the decrease of lethal as well as non-lethal types of violence. Thirdly, since homicide generally has a much lower dark figure (UNODC, 2013; Polk, 1994; Van Dijk, et al., 2007), any intervention aimed at reducing a specific type of homicide could be evaluated with greater accuracy. Since the change in homicide and violence appears to be related, this evaluation could subsequently be extrapolated to be applicable to the same type of violence, leading to a more reliable and accurate evaluation process overall.

Although this generalisation from homicide to violence would not be appropriate for all types, as the findings of the current study have shown, most types in both homicide and violence follow a similar pattern over time. The findings of this study could therefore help Police Scotland direct their resources more efficiently as well as accurately, help target policy interventions where they are most needed, and also help provide a more accurate framework for evaluating such interventions. The next section will discuss the theoretical implications of the study.

10.2.2 Theoretical implications

10.2.2.1 Crime drop theories

As mentioned in Chapter 2, a few theories have previously made assumptions about the relationship between the trends in homicide and violence when attempting to explain the decline in homicide, even though the nature of this relationship had not been empirically proven. For instance, most of the general crime drop theories such as the Security Hypothesis and Debut Crime Hypothesis (Farrell et al., 2010; 2014), assume that homicide is declining in tandem with other forms of crime, including both burglary and violence. Other hypotheses, such as the ‘Medical Care Hypothesis’, assume that homicide is declining while violence is increasing due to improved medical care (Blumstein, 2000; Harris et al., 2002). As argued in Chapter 2, this constitutes a gap within the crime trends research that the results from the current thesis might shed some light on. The results of the current study show that the trends in types of homicide and violence overall do follow a similar pattern. While public violence and homicide with the use of sharp instruments among young men have decreased, lethal and non-lethal domestic violence have increased in relative terms over time in Scotland. This means that theories assuming that homicide and violence are not following a similar pattern, such as the Medical Care Hypothesis, do not explain the changes in homicide and violence in Scotland. If the overall decrease in homicide could be explained by improvements in medical care, then surely the types of homicide and violence which are similar would demonstrate opposing trends. But as the results have shown, that is not the case. The Medical Care Hypothesis would furthermore postulate that all types of homicide would decrease equally, whereas the results of the

current study have shown that domestic homicides (the *Femicide* type) in fact have become relatively more common over time.

It would therefore seem that the general crime drop theories which assume that homicide and violence do follow a similar pattern over time might have more merit when explaining these trends in Scotland. The Security Hypothesis and Debut Crime Hypothesis (Farrell et al., 2010; 2014) for instance assume that both homicide and violence are decreasing due to increased securitisation and decreased availability to offend. Increased securitisation evident over the past decades have led to a decrease in 'debut crimes' such as burglary and car crime; crimes which constitute the start of an offending career (Farrell et al., 2011; 2014). Since fewer of such crimes are committed, fewer people move on to more serious crimes such as violence and homicide, leading to a decrease in these crimes as well. This would explain why public violence and homicide have declined in Scotland, however these theories do not offer an explanation for the change in lethal and non-lethal domestic violence. Violence occurring between intimate partners in their private home is not affected by increased securitisation or decreased availability of debut crimes. The Security Hypothesis and Debut Crime Hypothesis might therefore explain why lethal and non-lethal public violence have decreased in relative terms compared to the other types of lethal and non-lethal violence. However, these theories do not explain why there has been a relative increase in other types of lethal and non-lethal violence. As discussed, although homicide and violence do follow a similar pattern, this pattern is more complicated than just a general increase or decrease. This furthermore underlines the need for disaggregating trends in both homicide and violence to be able to understand this crime. Since no theory to date has taken different types of homicide and violence into account when explaining the changes in trends, no theory seems to be able to tell the whole story. The subsequent sections will therefore draw on different theoretical perspectives in order to explain the changing trends in homicide and violence over time.

10.2.2.2 Privatisation of Violence

So, what theoretical perspectives might help explain the changing pattern of both lethal and non-lethal violence evident over time in Scotland? Why has there been a relative increase of lethal and non-lethal domestic violence while public violence and homicide involving sharp instruments have decreased in both absolute and relative terms? As discussed, the decrease in knife violence among young men in public places is most likely related to the many interventions put in place in the mid-2000s. Although the decrease in this type of violence is great news, the relative increase in lethal and non-lethal domestic violence, despite many interventions and policy strategies, is all the more worrying.

Perhaps this change in the pattern of both lethal and non-lethal violence might be related to an overall change in the way we live our lives, or our routine activities (Cohen & Felson, 1979; Felson & Cohen, 1980). This is different from a displacement effect of violence since crime displacement assumes a shift in crime from one context to the other due to interventions (Clark, 1983; 1995). A change in our routine activities is however more universal. As argued by Aebi and Linde (2010), more time is generally spent inside in private settings and less time is spent in public places such as out on the street. Even though this might be related to socioeconomic status (Aebi & Linde, 2010), there has been an overall shift towards interactions in indoor, private settings. This change in how we interact and live our everyday lives has inevitably led to changes in violent crime as well. As Cooney (2003) argued, violence has become privatised, meaning that violence has become less public and more private. More time spent inside leads to more violent crime occurring inside, and less violent crime occurring outdoors in public places. Interventions such as the implementation of the Smoking Ban in 2006, prohibiting smoking in public places such as nightclubs and pubs (Scottish Parliament, 2005), and the reduction of the drink-drive limit (Scottish Parliament, 2017b) might also have contributed to a privatisation of time as well as violence (J. Carnochan, personal communication, August, 14, 2017). As such, it is not just a problem of crime displacement of a particular group of people, moving from being violent in public places to being violent in private places. Rather, this signals a shift of general behaviour in society; of a general privatisation of lifestyles as well as

violence. The fact that the *Stabbing* homicide type and the *No Weapon-Bludgeoning* homicide type, which both occurred in private settings indoors, have remained stable over time in relative terms and not decreased also suggests that there is a shift in the place of violence. This could explain the decrease in the *Rivalry* homicides and the *Public Weapon* type of violence, while simultaneously explaining the relative increase shown in the *Femicide* homicides and *Domestic* violence.

10.2.2.3 Masculinities and violence

Although this provides a contextual explanation for the changing pattern in violence, it does not offer an explanation for the possible mechanisms behind this increasing type of violence and homicide. In addition, it does not explain why some types of violence occurring indoors have remained relatively stable over time (such as the *Stabbing* homicide types and the *No Weapon-Bludgeoning* homicide type), while other types have demonstrated relative increases (such as the *Femicide* homicides and the *Domestic* violence type). If there has been a general privatisation of violence, then surely all types of violence occurring indoors should be increasing while only public types of violence should decrease in relative terms. Perhaps then, the explanation for the differences in trends is not only about a privatisation of violence, but about the characteristics of the people most commonly involved in these violent acts as well. As shown in the current study, the vast majority of the victims and offenders of both violence and homicide in Scotland were male. It can therefore be said that homicide and violence are overwhelmingly masculine activities. As discussed in Chapter 3, the connection between the performance of masculinity and violence has furthermore been widely demonstrated and theorised in previous research (see for instance Hatty, 2000; Messerschmidt, 1999; Polk, 1994; Ray, 2011). Violence has even been described as ‘integral to masculinity’ (Hatty, 2000:120). There also seems to be an intrinsic relationship between violence, masculinity and marginalisation (Polk, 1994;1999). Marginalised men who tend to be cut off from conventional routes of success or conflict resolution use violence and homicide as an expression of their masculinity (Polk, 1994;1999). This is especially true among young men (Polk, 1999), such as the individuals involved in the *Rivalry* homicides and *Public Weapon* violence type. It has also been found that marginalised, young men tend to commit more public violence

compared to young people of higher socioeconomic status (Aebi & Linde, 2010). Violence in these circumstances is not only seen as a possible route of action to resolve conflicts, but also as the *expected* route of action, and violence and homicide becomes a pathway for expressing masculinity. Recent research has also shown that there has been a big decline in convictions for young men in Scotland over time, including violence (Matthews, 2016). This might indicate that the way masculinity is perceived or constructed in Scotland might have changed over time, leading to a change in the pattern of violence as well.

But, as Polk (1994;1999) describes, it is not only the public homicides involving young offenders which are related to the expression of masculinity. Confrontational homicides, such as the *Stabbing* homicides and the *No Weapon-Bludgeoning* homicides, as well as domestic homicides such as the *Femicides*, are also related to the affirmation of masculinity. Either in the terms of violence as an appropriate response to resolving a conflict, or violence as a response to jealousy or possessiveness of an intimate partner. It is therefore arguable that all forms of homicide and violence are intrinsically related to masculinity and marginalisation (Messerschmidt, 1999; 2005; Polk, 1993;1999; West & Zimmermann, 1987).

But there is more to the story. Violence as an expression of masculinity is not only related to marginalisation, but as Hatty (2000) argues, how masculinities take their expression is related to contemporary male anxieties about issues such as unemployment, sexuality or identity. The expression of masculinity itself can therefore be seen as a mechanism of overcoming these anxieties. Masculinity in modern society however tends to be subjected to an unsustainable dichotomous split between ‘the respectable’ and ‘the dangerous’; extrafamilial and intrafamilial, which Hatty (2000) refers to as a new ‘pathology of the monstrous’ (Foucault, 1978:5). This form of ‘Othering’ of violent masculinity serves to distract the culture from the violent actions of ‘ordinary’ men by relegating ‘the monstrous to the zone beyond the family, outside the domestic’ (Hatty, 2000:66). The erosion of these dichotomous boundaries therefore leads to a crisis of masculinity, both *between* what is masculine and feminine, but also *within* masculinity itself. In other words, a crisis emerges when what it ‘means

to be man' is questioned and disintegrated. Additionally, the informalisation of traditional family relationships and the loss of power experienced by some men has contributed to this crisis (Ray, 2011). In light of this crisis, violence can become a demarcation in itself; a reaffirmation of boundaries. But it also about power; an expression of perceived powerlessness (Ray, 2011). In light of recent changes in lethal and non-lethal violence over time that this study has uncovered in Scotland, it is feasible to assume that the construction of masculinity, and its relationship to violence, has changed in Scotland as well.

10.2.2.4 The Vertigo of Masculinity

Violence, then, can be viewed as an expression of masculinity, symptomatic of increased anxiety and perceived powerlessness around the construction of gender and identity in society; an insecurity around the erosion of boundaries. As Young (2007) argues, late modernity overall has led to a feeling of disembeddedness on both a social and individual level, a feeling of insecurity and precariousness in the context of blurred normative boundaries. The sense of self and the sense of identity can therefore be described as being in an overall crisis, for everyone, where personal narratives and the construction of identities become fraught with difficulty. This also gives way for an 'Othering', or a re-establishing of boundaries and lines of demarcation as a way of escaping this uncertainty. This is what Young (2007) refers to as the Vertigo of Late Modernity, a sense of ontological insecurity which leads to a dizzying fear of falling, of powerlessness, and anger, and where re-establishing of boundaries and increased punitiveness are expressions to regain a sense of control, or footing. Although Young refers this vertigo to the strife of late modernity and the challenges of economic as well as ontological insecurities, this can also be reframed as a crisis of masculinity, where the erosion of the boundaries around the construction of masculinity in society leads to a perceived sense of powerlessness, an ontological insecurity around gender and identity; a *Vertigo of Masculinity*. Violence as an expression of masculinity has historically been culturally engrained in Scotland, evident through the notion of 'the hardman' or 'the fighting man' of the 1920s and 1930s (Davies, 2007; Fraser, 2015:68) and although this link still remains (Fraser, 2013; 2015), societal changes brought on by late modernity have undoubtedly changed the notion of what it means to be a man

and how masculinity is constructed in Scotland. Violence, then, can be conceptualised as an expression to regain footing in this experience of vertigo, as a way of re-establishing the boundaries around masculinity. The act of violence becomes a reaffirmation of masculinity when the individual is experiencing an overall feeling of powerlessness and insecurity, as a way of relieving that insecurity.

Homicide, then, can be conceived as the extreme end of this expression, where the sense of vertigo is increased by the presence of a social audience. As Polk (1994;1999) argues, the presence of a social audience in general, and a male social audience in particular, can act as a lethality mechanism, since backing down would mean the loss of face or appearance. In a response to this increased ontological insecurity, or sense of vertigo around masculinity, the violence therefore escalates into homicide. This means that in the context of the privatisation of violence, where violence has become more private and less public, these types of public homicides, like the *Rivalry* homicides, would decrease. This would in other words provide another explanation for the decrease in lethal as well as non-lethal violence among young men in public places. Violence as an expression of masculinity is however not dependent on context; there is no way of 'designing out' violence caused by these mechanisms. If violence is perceived as an expression of masculinity, and if violence is presumed to be privatised, this means that this violence to a higher degree will be directed towards intimates and family members. This does not necessarily mean that there has been a shift of the same violent people from one context to another, but rather that in the context of the privatisation of both lifestyles as well as violence, more time is spent with family members overall, increasing possible tensions in these relationships. People who might not have been violent in public settings might therefore respond violently in private settings due to the increased time spent in this context with people in close relationships. If violence, then, is used to affirm one's gender identity, as an expression of masculinity in a situation of perceived powerlessness, this mechanism will not disappear just because there has been a change in how we spend our time or live our lives. Instead, violence, which acts as a demarcation of boundaries, is directed towards the people which challenge these boundaries, whether it is an intimate partner or someone at the pub. The mechanisms behind the violence are in other words the same,

but due to the changes in the way we live our lives, the distribution of the types of both lethal and non-lethal violence has changed. Lethal as well as non-lethal violence occurring in private settings between intimate partners has increased in relative terms, since more time is spent in these settings and the people who challenges the notions of masculinity are more likely to be people encountered in these settings. Although friends and acquaintances also spend more time together in private settings now compared to previously, this does not compare to the time spent with family members and intimates since, by definition, these people have a closer relationship. Therefore, it is more likely that the people who are perceived to challenge the notions and the construction of masculinity are intimate partners and family members. This would in other words explain why certain types of violence, such as the *Stabbing* homicide type and the *No Weapon-Bludgeoning* homicide type have remained stable in relative terms, while domestic types of violence, such as the *Domestic* type of violence and the *Femicide* homicide type, have increased relative to other types.

So perhaps the changing trends in homicide and violence could be explained by these mechanisms. In the context of the privatisation of violence and a general shift towards more time spent indoors in private settings, violence can be conceived as an expression of perceived powerlessness at a time of ontological uncertainty in regards to identity and gender. Homicide can then be considered the extreme end of this expression, fuelled by the presence of a social audience which acts as a lethality mechanism, preventing the actors from disengaging without losing face. This would explain the trends of homicide and violence in Scotland; explain why both public homicide and violence have decreased while at the same time explaining why lethal as well as non-lethal domestic violence has increased over time. It would also explain why only certain types of lethal and non-lethal violence occurring in private settings have increased and not others; since violence is directed towards people who challenge the notions of masculinity, and the people most likely to do so in private settings are intimates and family members, it is more likely that violence as an expression of masculinity is targeted towards intimates and family members in comparison to other people in private settings. This would explain the relative increase in lethal and non-lethal domestic violence, the lack of change in other forms of violence occurring

indoors, and the decrease in lethal and non-lethal public types of violence. Put differently, this could be thought of as the *Vertigo of Masculinity*, where violence (both lethal and non-lethal) becomes an expression of perceived powerlessness in a time of ontological uncertainty in regards to masculinity.

Overall, it is consequently argued that the multiple interventions put in place in the 2000s, framing violence as a public health problem and promoting multi-agency collaborations to tackle the problem, have led to an overall decrease in homicide and violence, driven by the decrease in lethal and non-lethal violence among young men in public places using sharp instruments. The relative increase in lethal and non-lethal domestic violence might however be symptomatic of a greater problem in relation to violence in Scotland, relating to cultural notions of gender, marginalisation and identity. While the findings in the current study have suggested that many interventions put in place are likely to have been successful in reducing violence, the greatest challenge moving forward will be to attempt to change these constructions of gender which are conducive of violence. Framing violence as a public health problem related to issues of marginalisation, gender and identity is however a good step on the way towards reducing all types of violence in Scotland. In the context of the privatisation of violence, where violence is becoming less visible, it is more important than ever that all types of violence are prevented equally.

10.3 Limitations and Implications for future research

The findings of the current study go a long way to fill the gaps identified in the beginning of this thesis; however, no study is without its limitations. One of the most obvious limitations of the current study is the difference between the two datasets that were compared. While the homicide dataset spans from 2000 up to 2015, the violence dataset only spans from 2008-09 to 2014-15. The two datasets were also based on different sources, using police recorded data for the homicide dataset (the SHD) and survey data for the violence dataset (the SCJS). This meant that certain variables, such as motive, differed substantially between datasets since one was recorded as part of a police investigation and one was estimated by the victim. All the offender data in the violence dataset was furthermore less reliable compared to the homicide dataset since

this information was estimated by the victim in the violence dataset. This meant that certain aspects of the data were not comparable across datasets.

However, as argued in Chapter 1, the comparison between the two typologies was still considered relevant, despite these shortcomings, since no previous study has compared subtypes of homicide and violence in this way before. Any information drawn from this study, albeit imperfect, would therefore be valuable. Furthermore, extensive measures were taken in order to ensure that the two datasets were as similar as possible, including how the variables were matched up, recoded and how the modelling was conducted. As mentioned in Chapter 4, an initial attempt to add more sweeps to the violence dataset had to be abandoned since the differences in survey sweeps proved too great. The current study might therefore bring some useful lessons to the creators of the SCJS in relation to survey sweep consistency. If any long-term research is to be carried out with the use of the SCJS, the variables and questions need to be consistent over time. The sweeps between 2008-09 and 2014-15 have almost identical methodology, which enabled the research conducted in the current study. Future useful research such as this will be possible if the consistency in survey methodology is upheld in subsequent survey sweeps. Future research examining violence in Scotland should examine whether this pattern of types of violence would be observed if a longer time period was studied. A longer time period beyond these current survey years would also be of interest in order to examine how the typology identified in the current study have changed over a longer time period.

It is also important to bear in mind that all information reported in the SCJS data is derived from survey questions asked to the victim. All the information provided is therefore to be considered as experiences of the crime by the victims. The information about the offender is therefore information provided from the victim's perspective and should be interpreted as such. It is also important to note that the data was retrieved from the Victim Forms of the SCJS and not the Self-completion part of the survey. Variables relating to domestic abuse and sexual victimisation might therefore be underreported in the current study, which might affect the results. This is slightly different from the usual reporting of sexual victimisation and domestic violence by the

SCJS, which are usually published in separate reports based on the Self-completion part of the survey. The Self-completion part of the SCJS does however not include as rich information about the victim, offenders or the incident itself as the Victim Forms, and it was therefore decided to not use the Self-completion part of the surveys in the current study. It would however be useful for future research to examine domestic violence in more detail using the Self-completion part on the SCJS in order to provide an in-depth examination of this particular type of violence to complement the current findings.

Another limitation of the violence dataset was that no individual under the age of 16 was included, even though victims in the homicide dataset could be of any age. This further highlights the relevance of following up this research with a comparison of police recorded violence in order to examine the differences between police recorded data and victimisation measures of violence. Additionally, due to the fact that the offenders were predominantly male, no classes with predominantly female offenders were identified in the current sample. Future research on violence subtypes might therefore divide the crimes by offender gender before conducting cluster analysis on the data, similarly to Soothill et al., (2002).

As argued in Chapter 4, it was still deemed favourable to use victimisation data over police recorded crime data in the current study for two main reasons. Firstly, victimisation data has been argued to be a more reliable measure for estimating the levels of crime within a country compared to police recorded crime since recorded crime is more sensitive to changes in reporting and recording (Tonry, 2014; Van Dijk, Van Kesteren & Smit, 2007). Secondly, the dark figure of hidden crime is estimated to be higher in police recorded crime, particularly regarding domestic violence, compared to victimisation data (Scottish Government, 2016d; Brookman, 2005). Despite the shortcomings of the SCJS, it was therefore considered the most appropriate and best fitting dataset for the current study. Future studies should however identify subtypes of police recorded violence and compare these to the types found in the SCJS data. If the same types were identified, this would further validate the types as well as improve the reliability of police recorded measures of violence.

Another limitation to the study which was discussed in Chapter 4 was the high level of missingness in the homicide data. Although many measures were taken to reduce the missingness, including recoding of certain variables, a deeper examination of case files and the exclusion of the first ten years of the data (see Chapter 4), much missingness still remained. This study consequently has important implications for Police Scotland regarding the coding of the homicide data. Stricter rules about coding, such as introducing a code book, might be necessary in order to improve this database as well as being rigorous about entering negative categories rather than just leaving the box blank. Although police officers are short for time when introducing the information in the database, improving the data quality is important for future work on homicide. The identification of homicide subtypes should therefore be conducted again once even more missingness is corrected in the data in order to validate the types identified here.

The multilevel LCA's, although statistically robust techniques, are also explorative in nature. The types of violence identified in the current study are a reflection of patterns identified in violent crimes in Scotland, but no causal inferences have been made as to why the patterns or characteristics of violence has changed in Scotland. Due to the fact that LCA is a data reduction technique, certain smaller types of violence might still be obscured in the data since they are incorporated in the larger classes. This is however an inevitable cost of using this type of technique where large amounts of data are summarised based on its patterns.

A few of the classifying variables used in the analysis failed to disaggregate between the types, including ethnicity of the offender and the victim, time of the day the crime was committed and whether or not the crime was sexually motivated. These were however still included in the model for substantive reasons. Not only were these variables of interest when disaggregating violence but as mentioned in Chapter 4, the violence typology was modelled after the homicide typology in order to make them as comparable as possible. It was therefore decided to keep these variables in the model, even though some of them did not disaggregate between the types.

Another limitation, as discussed in Chapter 4, was the lack of confidence intervals around the estimates of the average probability of belonging to each class per year group. This means that there is no error estimate available around the average probabilities, meaning that these measures should be interpreted with caution. However, since the bootstrapped confidence intervals both assumed normality of the data and failed to take the uncertainties of the latent estimates into account, it was ultimately decided that including inaccurate confidence intervals would be misleading.

The findings in the current thesis have identified different types of homicide and violence. However, due to the nature of the analysis, although relationships between different variables are identified, the analysis does not ‘explain’ the causal mechanisms behind these relationships. For instance, although the current study has shown that lethal as well as non-lethal domestic violence has increased in relative terms, the analysis does not provide an explanation of why this type of violence has increased. Although this was theorised in Chapter 9, any causal conclusions about the changing trends in homicide and violence would require specific examination of the effects of various interventions and the personal narratives of individuals committing these crimes. This would also be an interesting topic for future research.

Finally, although this was the first study of its kind to examine subtypes of homicide and violence in this way, it is encouraged that studies should repeat this analysis in different contexts. The exploratory and descriptive nature of the study, although not necessarily a limitation, restrict the generalisability of the results. Similar research in other contexts would provide interesting comparative analysis as well as increase the understanding for the relationship between homicide and wider violence overall. This study has identified certain context-specific types such as a prevalent use of sharp instruments, whereas if this research were to be repeated in for instance the U.S, a higher usage of firearms will most likely be identified. Since different types of homicide and violence have been shown to demonstrate different patterns over time, any future studies examining the trends in homicide and violence should therefore take this heterogeneity of the crime into account.

10.4 Original contribution

This thesis has made original contributions to several different areas of research including the study of trends in homicide and violence, typology research and to theories and policies concerning serious violence. These contributions can be summarised into seven different themes. Firstly, this study has added to research examining whether homicide and violence measure similar underlying behaviour, only differentiated by outcome, by examining the similarities and differences of the characteristics of these two crimes. The findings of the current study demonstrate similarities between certain types of homicide and violence, suggesting that homicide indeed can be regarded as the extreme end of a violence spectrum.

Secondly, although previous studies have examined trends in homicide and violence, this is the first study to compare disaggregated trends in both homicide and violence over time. As argued at the beginning of this thesis, there was no consensus regarding the relationship between the trends in homicide and violence, despite previous research, since homicide and violence are so heterogenous that aggregate trends fail to capture the whole story. This study has however taken the first step towards determining the relationship between these two crimes by examining the relationship between disaggregated trends.

Thirdly, this study has contributed to typology research in two main ways. Due to the inductive and explorative method used to identify the subtypes in the current study, as well as the use of many different classifying variables, it is argued that the current study has provided a more nuanced understanding of homicide typologies than previously attempted. Previous approaches to identifying subtypes have usually used the *a priori* method (see Chapter 5), which limits the possibility of identifying new subtypes, or only used a few classifying variables guided by previous research. Although both these approaches are valid methods to identifying subtypes, none of them offer as nuanced, multifaceted and yet distinct subtypes as were identified in the current study. The second way this study has contributed to typology research is by the use of multilevel LCA as a statistical technique. No previous study has used this technique to identify subtypes of homicide and violence, and no other study has

examined how these subtypes have changed over time. As argued, because of the possibility of modelling complex data on more than one level, the use of this particular method provided unique insights into subtypes of both homicide and violence and it is encouraged that this method is used in the future to take these complexities into account.

Fourthly, this study has methodological contributions to research. This is not only the first time multilevel LCA modelling in this way has been conducted in criminology, but the simultaneous modelling of latent constructs on both the within and the between levels with covariates have not previously been conducted on weighted survey data, as is the case with the violence model in the current study. As mentioned in Chapter 4, non-parametric multilevel LCA modelling on unweighted survey data has been conducted (see Morselli & Passini, 2012), as has the use of parametric multilevel LCA modelling on weighted survey data (see Tobler, Komro & Maldonado-Medina, 2009) but no published study has used non-parametric multilevel LCA modelling on weighted survey data. This technique allows the researcher to take nested data structures into account while simultaneously examining latent constructs in the data and has proven very useful for the current study. This further highlights the potential value for using advanced statistical methods and fully acknowledging the complex structures of data. Although less complex methods could have been used, these would not have represented the data as well and could consequently have led to interpretation error and diminished validity of the results.

Fifthly, this thesis provides some original theoretical contributions around homicide and violence. As mentioned, it is argued that theories which make assumptions about the trends in homicide and violence need to disaggregate homicide and violence in order to provide an explanation for the change in these crimes. This thesis has argued that different types of lethal and non-lethal violence change differently over time and any theory which attempts to explain these changes should therefore take this difference into account in order to provide a holistic explanation. The notion of a *Vertigo of Masculinity* is furthermore an original theoretical concept for this study.

Sixthly, this thesis has provided contributions in the area of violence policy. Since homicide and violence are argued to follow a similar pattern over time, similar policies could be used to tackle certain forms of both homicide and violence. Since few countries have specific policies to combat homicide, including Scotland, this was an important finding. This thesis furthermore argues that because of this relationship, trends in homicide can be used to monitor trends in violence, which provides unique possibilities for streamlining intervention and prevention strategies for these crimes, making the work more efficient as well as accurate. But this thesis has also contributed to policy by arguing that different types of homicide and violence needs to be tackled differently. Although homicide overall might not require a specific policy, certain types of both lethal and non-lethal violence, such as domestic violence or violence in the work place, do need to be targeted specifically since these different types of lethal and non-lethal violence are demonstrating different trends over time.

Finally, this thesis is the first study to conduct an in-depth examination of homicide and violence in Scotland. No other study has previously examined homicide and violence in this way or analysed the change in trends in these two crimes in this country. Given the problematic history of violence acknowledged by others in this thesis, this study therefore provides a unique perspective on both lethal and non-lethal violence in Scotland, taking the first step towards filling the gap in knowledge about these two crimes.

10.5 Summing up

Despite the limitations mentioned above, the current thesis has fulfilled the objectives and aim set out in the beginning and provided answers to the research questions. This study began with a problem. Over the past decade, Scotland has gone from being ‘one of the most violent countries in the Western World’ (BBC News, 2005; The Guardian, 2005) to having record low levels of homicide. Although this decline constitutes a source for great optimism, the problem was that we did not know enough about this decrease. Although both homicide and violence are decreasing, we did not know if these two crimes were decreasing in tandem or if they demonstrated different patterns

in their decrease. We did not know if all types of lethal and non-lethal violence were decreasing or if there were in fact hidden countertrends in the aggregated data.

This thesis has taken large steps towards providing answers to these unknown facts about the decline. Homicide and violence are in fact following a similar pattern over time, and although homicide and violence are decreasing overall, some types of lethal and non-lethal violence are increasing in relative terms. This means that although the evident decline in homicide and wider violence is good news, this is not the whole story and there is still a long way to go in order to prevent all types of violence equally in Scotland. Lethal and non-lethal domestic violence has demonstrated a relative increase over time and this needs to be the next focus for Scottish violence polices. The quote by John Carnochan (2015) stated in the beginning of this thesis suggests that violence in Scotland is not just a numbers game, but a cultural problem which needs to be tackled accordingly. As argued in the current thesis, future interventions should focus on tackling the cultural and social issues related to violence, particularly around issues concerning the construction of masculinity, in order to keep preventing and reducing all types of homicide and violence.

There is however another quote by John Carnochan (2015, p. 9) which has become the tenet and approach of the Violence Reduction Unit (VRU, 2016); ‘Violence is preventable, not inevitable’. The dramatic fall in homicide and violence evident over the past decade has changed the outlook on violence in Scotland as well as changed the perception of what is possible. The findings in the current thesis shows that the decline in homicide and violence evident over time has been driven by the decline in public violence involving young men with sharp instruments in public places. Since this was precisely the type of violence many of the interventions put in place in the mid-2000s were attempting to reduce, it would seem that the holistic, multi-agency approach framing violence as a public health problem has had an effect. Although there is a long road ahead to change the cultural perceptions relating to violence in Scotland, particularly around domestic violence, the findings of the current study are grounds for optimism. Violence is preventable, not inevitable.

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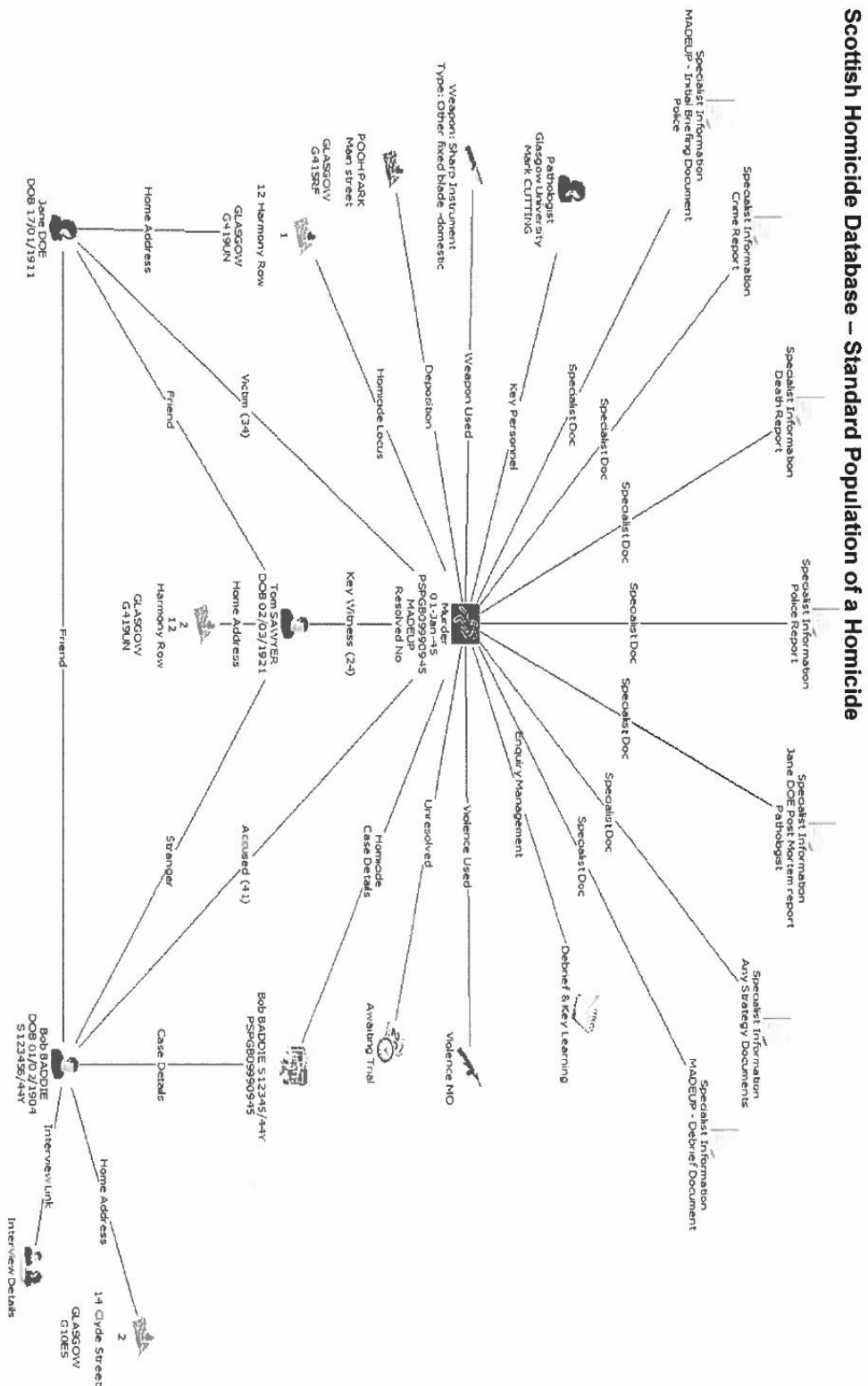
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Appendix 4.1: Variables included in the Scottish Homicide Database



Appendix 4.2: List of all the variables extracted from the SHD

- 1) Crime number
- 2) Force
- 3) Police Scotland division
- 4) Recorded crime classification
- 5) Indicted classification
- 6) Day committed from
- 7) Date committed from
- 8) Time committed from
- 9) Debrief complete
- 10) Resolved
- 11) Homicide synopsis
- 12) Reported date
- 13) Reported time
- 14) Category of homicide
- 15) Location of incident room
- 16) Prior victim activity
- 17) Engaged in prostitution
- 18) Stranger homicide
- 19) Prior offender activity
- 20) Offender activity – post
- 21) Motive 1
- 22) Motive 2
- 23) Motive 3
- 24) Motive summary
- 25) Theft
- 26) Theft details
- 27) Cause of death Summary
- 28) Linked case
- 29) Unique person reference number
- 30) Offender/victim age at time of crime
- 31) Previous crime of offender/victim
- 32) Previous victimisation of offender/victim
- 33) Offender/victim licence conditions
- 34) Offender/victim licence conditions details
- 35) Offender/victim alcohol influence
- 36) Offender/victim drug influence
- 37) Offender deceased
- 38) Offender/victim gender
- 39) Offender/victim ethnicity
- 40) Offender/victim nationality
- 41) Offender/victim current age
- 42) Offender/victim marital status
- 43) Offender/victim number of dependents
- 44) Offender/victim dependents at home
- 45) Offender/victim residential status
- 46) Offender/victim employment status
- 47) Offender/victim financial status
- 48) Offender/victim alcohol usage

- 49) Offender/victim drug usage
- 50) Location details
- 51) Body positioning
- 52) Body moved more than walking distance
- 53) Distance moved
- 54) Body disposal details
- 55) Victim discovery details
- 56) Found within premises
- 57) Found outside
- 58) Found within vehicle
- 59) Body covered but not buried
- 60) Body dismembered
- 61) Body buried
- 62) Body found beside or in water
- 63) Body not recovered
- 64) Body burned
- 65) Location discovery description
- 66) Deposition details
- 67) City or town
- 68) Country
- 69) Description of neighbourhood
- 70) Body found inside or outside location
- 71) Body found public or private location
- 72) Other descriptive information
- 73) House type
- 74) Outdoors description
- 75) Primary weapon
- 76) Weapon type
- 77) Weapon specific
- 78) Weapon selection
- 79) Cause of death: blunt object
- 80) Cause of death: drowning
- 81) Cause of death: drugs
- 82) Cause of death: fire
- 83) Cause of death: physical assault
- 84) Cause of death: poisoning
- 85) Cause of death: sharp instrument
- 86) Cause of death: shooting
- 87) Cause of death: strangulation/asphyxiation
- 88) Cause of death: other
- 89) Cause of death: cannot be established
- 90) Post mortem summary
- 91) Secondary injuries: stab/knife wound
- 92) Secondary injuries: body/head blows
- 93) Secondary injuries: gunshot
- 94) Secondary injuries: mutilation
- 95) Secondary injuries: sexual injuries
- 96) Secondary injuries: other
- 97) Secondary injuries: summary
- 98) Trophy taken from victim
- 99) Summary of sexual behaviour
- 100) Ligature, gag or binding use

Appendix 4.3: Data Access agreement for homicide data

MINUTE OF AGREEMENT

Between

THE CHIEF CONSTABLE OF THE POLICE SERVICE OF SCOTLAND ('Police Scotland'), appointed in terms of Section 7 of the Police and Fire Reform (Scotland) Act 2012), and having his headquarters at Tulliallan Castle, Kincardine, Fife, FK10 4BE ('the **Chief Constable**')

And

THE UNIVERSITY OF EDINBURGH, a charitable body registered in Scotland under registered number SC005336 and incorporated by the Universities (Scotland) Act 1889, as amended by the Universities (Scotland) Act 1966, and having its principal office at Old College, South Bridge, Edinburgh, EH8 9YL 'the **University**') (together 'the **Parties**')

WHEREAS

- A** The Chief Constable agrees to the University conducting an analysis of Homicide data, in order to undertake the research described in Schedule One of this Minute of Agreement ('the **Research**');

- B** The University has agreed to the terms and conditions contained herein;
- C** In recognition of the provision of the Police Scotland data ('the **Police Data**') by the Chief Constable to the University, the Parties have agreed to enter into this Minute of Agreement setting out the type of Police Data to be provided and the terms and conditions under which the Chief Constable will provide the Police Data;
- D** In this agreement any Reference to request or requirement by the Chief Constable shall be taken to mean Chief Constable or nominated officer.

NOW THEREFORE the Parties agree as follows:-

1 Term

- 1.1 Notwithstanding the date or dates hereof, the Research shall commence on 31st March 2015 and, unless terminated sooner in terms hereof, continue until the end of the PhD period in August 2018.

2 Obligations of the University

- 2.1 The University shall use reasonable endeavours to carry out the Research in accordance with the terms of this Minute of Agreement.

3 Nominated Personnel

- 3.1 The University has indicated that the work to be undertaken in terms hereof will be principally undertaken by Sara **SKOTT BENGTTSSON** ('the **University Researcher**'), acting under the supervision of Professor Susan **McVIE** and Dr Paul **NORRIS** ('the **University Supervisors**'), (being employees of the University and herein referred to as 'the **Nominated Personnel**'). The Nominated Personnel shall include any additional or substituted personnel proposed by the University and approved by or on behalf of the Chief Constable in terms of this Clause 3.
- 3.2 In the event that the University wishes to utilise persons other than the Nominated Personnel (either in addition to or in substitution for the Nominated Personnel) then the University must indicate to Police Scotland, in writing, in advance, any additional or substituted persons and identify those persons by full name, date and place of birth and, prior to those persons joining or replacing the Nominated Personnel hereunder, such persons must be approved to the University by or on behalf of the Chief Constable.
- 3.3 The Chief Constable shall have the entitlement to refuse to approve the proposed appointment of any additional or substituted persons so notified, without the need to give reasons for said refusal and, where the Chief Constable has refused to approve the appointment of such a person, that person shall not undertake the Research and shall not access the Police Data.
- 3.4 The provision of the Police Data to the Nominated Personnel and to any approved addition thereto or replacement thereof will in no way detract from the University's obligations hereunder or limit the University's liability hereunder and the University acknowledges and warrants that it shall be responsible for all acts and/or omissions of the Nominated Personnel and any approved addition thereto and/or replacement thereof.

4 The Police Data

- 4.1 Details of the Police Data are contained in Schedule Two of this Minute of Agreement. For the purposes of Clauses 15, 17 and Schedule Two, the Police Data as provided in its original form is referred to as ‘the **Original Data**’
- 4.2 Responsibility for ensuring the safekeeping of the Police Data lies with the University. The data will be stored in the manner outlined by the University and will be in control of the nominated personnel.
- 4.3 No undertaking or guarantee is given by the Chief Constable as to the amount of Police Data that may from time to time be made available to the University under this Minute of Agreement.

5 No Fees

- 5.1 There will be no exchange of fees between Police Scotland and the University in respect of Police Data provided during the term of this Minute of Agreement

6 Relationship between the Parties

- 6.1 By their subscription hereof, the Parties agree that the Research undertaken by the Nominated Personnel does not constitute their entering into a contract of employment with either the Scottish Police Authority (‘the **Authority**) or the Chief Constable and that the University maintains full employer responsibility for the Nominated Personnel. The University also agrees that the Nominated Personnel (when working with Police Scotland) shall comply with those provisions of the Health & Safety at Work etc Act 1974 and any related subordinate legislation and codes of practice relative to self-employed persons.

7 Conflicts of Interest and Reputation

- 7.1 By their acceptance of this appointment, the University, the University Researcher, the University Supervisor and the other Nominated Personnel agree that they shall not use the Original Data where there might be a conflict of interest, or where the work or the Research using same in any other way impinges on Police Scotland's interests or brings Police Scotland into disrepute. The University shall immediately advise the Chief Constable as soon as it becomes aware of any potential conflict of interest or work in connection with the Police Data and/or the Research that might impinge on Police Scotland's interest or bring Police Scotland into disrepute and seek the advice of Police Scotland in relation to the same.

8 Confidentiality

- 8.1 The University and the Nominated Personnel shall not communicate to any third party the Police Data so provided, nor the contents of any document or report relating to Police Scotland, nor the proceedings or business of Police Scotland, unless required by law or expressly authorised to do so by the Chief Constable, or nominated officer acting on his behalf. The University and the Nominated Personnel shall act in accordance with Police Scotland's obligations to adhere to the Data Protection Act 1998.
- 8.2 All information acquired by the University, the University Researcher, the University Supervisor and the other Nominated Personnel in the performance of the Research in terms of this Minute of Agreement, concerning the activities, practices, processes, procedures or operations of Police Scotland, individual Police Scotland officers or members of Police Scotland staff, and any third party (including members of the public) with whom the Nominated Personnel deal in

the course of the Research shall be regarded as confidential information. Without prejudice to the application of the Official Secrets Acts 1911 to 1989, the University by its subscription hereof agrees that the University and its staff shall not disclose any such confidential information except as is expressly authorised by the Chief Constable, or any nominated officer acting on his behalf, or which is otherwise required by law; and the University shall ensure that the Nominated Personnel shall not disclose any such confidential information, except as aforesaid.

9 Indemnity

- 9.1 The University shall be liable for and by its subscription hereof agrees to free and relieve and indemnify the Chief Constable against any liability, loss, damage, costs, claims and proceedings whatsoever suffered by the Chief Constable arising as a result of the University, University Researcher, the University Supervisor, or other Nominated Personnel's, negligence or wilful misconduct.

10 Insurance

- 10.1 The University shall, throughout the duration of the appointment hereunder, and for a period of six years after the termination date, have and maintain a current and valid policy of professional indemnity insurance acceptable to Police Scotland, providing, in the opinion of the Director of Finance or the Chief Finance Officer, adequate insurance with an indemnity limit of £1,000,000 on any one claim against any liability the University may incur as a result of its or the University Researcher, the University Supervisor's or other Nominated Personnel's negligence or wilful misconduct. As and when requested by the Director of Finance or Chief Finance Officer, the University shall provide to that officer evidence of its professional indemnity insurance policy or details thereof and evidence of payment of the last premium due. Failure to provide the said evidence during the period referred to in Clause 1 hereof shall entitle the Chief

Constable to terminate this Minute of Agreement forthwith by written notice to that effect.

11 Access to Research

- 11.1 The Nominated Personnel shall afford the Chief Constable reasonable access to the material produced during the period of the Research, including any work in progress, and to all documents (in particular documents recording methodology, results and analyses of Police Data) produced (howsoever they may be produced or recorded, whether in electronic form or otherwise) in connection with the Research, and the University Researcher Supervisor will provide the Chief Constable with copies of any documents referred to in this Clause 11 if requested to do so by the Chief Constable.

12 Meetings

- 12.1 The University Researcher and such other members of the Nominated Personnel, as agreed between the Parties to be appropriate, shall meet regularly with a nominated Police Scotland representative at such intervals as shall seem proper, to discuss progress of the Research. The dates of such meetings shall, without prejudice to the foregoing generality, enable regular reports on progress of the Research to be made by the nominated member of Police Scotland to the Chief Constable.

13 Final Report

- 13.1 Upon completion of the Research the final report shall be made available to any such representatives nominated by Police Scotland on behalf of the Chief Constable. This shall include:

13.1.1 a statement of the objectives, methods, and conclusions of the Research;

13.1.2 a concise summary of the results of the Research; and

13.1.3 A copy of the report, in a format to be agreed at the time.

14 Publication

14.1 In principle, the Chief Constable supports the publication and dissemination of research findings. However, the prior written agreement of the Chief Constable (acting reasonably) must be obtained if at any time during or after the conduct of the Research it is intended to publish, present or communicate publicly any findings from the Research. Permission must be sought at least six weeks in advance of the date of the intended presentation or publication, and a reply will be provided by the Chief Constable within six weeks of permission being sought. The Chief Constable will expect a reasonable opportunity to amend factual inaccuracies and to publish a disclaimer as to views or conclusions expressed.

15 Intellectual Property Rights

15.1 All property rights, including all copyright and other intellectual property rights of the Police Data provided to the University and/or Nominated Personnel shall remain with the Chief Constable.

15.2 All property rights, including all copyright and other intellectual property rights in the materials produced as part of the Research, (not being the Original Data or any part thereof, the copyright and intellectual property rights to which shall at

all times remain vest in the Chief Constable) shall vest in the University, declaring that notwithstanding the aforesaid, the Chief Constable shall be provided with a copy of all materials produced as part of the Research (in whatever form and whether to be published or otherwise) and any Police Data, research results, reports or other material , in whatever form, which are intended to be used in any manner or published (which publication shall require to be in a form and by such media as are approved in writing in advance by the Chief Constable, acting reasonably) shall require to be approved by the Chief Constable prior to such use or publication, in the same manner as provided for in relation to the Publication of Research findings in Clause 14 hereof.

- 15.3 All material produced under this Minute of Agreement (not being the Original Data, or any part thereof) including maps, plans, photographs, drawings, tapes, statistical data, published and unpublished Research results, reports and digital data, shall vest in the University.

16 No Warranties

- 16.1 Whilst the University Researcher, the University Supervisor and the other Nominated Personnel shall use reasonable skill, care and attention, no warranty is given by the University in relation to any reports, data, drawings, diagrams and/or any other information whatsoever that may result from the Research and may be provided to the Chief Constable and the Authority by the University or the use(s) to which any of the foregoing may be put by the Chief Constable and the Authority or their fitness or suitability for any particular purpose or under any special conditions, except insofar as set out herein. All materials, Research results, reports or otherwise (not being the Original Data or any part thereof) provided to the Chief Constable in terms of these presents shall, notwithstanding that the copyright and intellectual property rights are vested in the University, may be used by Police Scotland and/or the Authority without the requirement of any prior consent from the University.

17 Termination

- 17.1 Either the Chief Constable or the University shall be entitled to terminate this Minute of Agreement with immediate effect and without notice at any time. Without prejudice to the foregoing, the Chief Constable may terminate the Agreement if, at any time, the University Researcher, the University Supervisor or any of the other Nominated Personnel has, without good cause, failed to perform the obligations incumbent upon them in terms of this Minute of Agreement, or the Chief Constable is satisfied that any of the University Researcher or the University Supervisor or other Nominated Personnel has been involved in an act of misconduct (which need not be criminal misconduct) during the period of the Research or that by reason of any other matter or circumstance the University Researcher, the University Supervisor or other Nominated Personnel have shown themselves not fit to receive the Police Data, or that the conduct of the Principal Investigator or other Nominated Personnel (whether or not in terms of the appointment hereunder) is such as would bring Police Scotland into disrepute, or in any other way impinge on Police Scotland's interests. Termination in terms of this Clause 17 will not affect any of the rights and/or obligations incumbent open the Parties up to the date of termination, including the liability of the University arising as a result of the negligent acts and/or omissions of Nominated Personnel in terms of Clauses 3 and 9 hereof.

18 Notices

- 18.1 Any notice required to be served or given in terms of this Minute of Agreement shall be sufficiently served if sent by first class recorded delivery post or facsimile transmission and addressed in the case of the Chief Constable, marked for the attention of the officer nominated to act on behalf of Police Scotland; and in the case of the University and/or the Principal Investigator and/or other Nominated Personnel to their last notified place of business address and fax number.

19 Assignment

19.1 The University shall not be entitled to assign its rights and obligations arising hereunder, whether in whole or in part, to any other party, without the prior written consent of the Chief Constable.

20 Entire Agreement

20.1 This Minute of Agreement constitutes the entire agreement between the Parties and the terms hereof shall not be varied or amended unless such variations or amendments are agreed in writing by or on behalf of both Parties by duly authorised representatives.

21 Law and Jurisdiction

22.1 This Minute of Agreement shall be construed under and governed in accordance with the laws of Scotland and subject to the exclusive jurisdiction of the Scottish courts.

In witness whereof these presents are subscribed for on behalf of the Parties by the signatories after mentioned.

For and on behalf of the Chief Constable

Authorised Signatory

.....

Witness

.....

..... Name
..... Name
..... Designation
..... Date
..... Name
..... Designation
..... Date

For and on behalf of the University

Authorised Signatory

Witness

.....
..... Name
..... Designation
..... Date
..... Name
..... Designation
..... Date
..... Date

SCHEDULE ONE

THE RESEARCH

Background to the research

Ten years ago Scotland gained the unenviable reputation as being “the most violent country in the developed world” (BBC News, 18th September 2005) following the publication of a UN report. Previous research also found that Scotland had a high homicide rate in comparison to England and Wales (Soothill, Francis, Ackerley and Collett, 1999). Over the last decade, however, rates of non-sexual violent crime and homicide in Scotland have declined significantly (Scottish Government, 2014). It would appear that homicide rates have followed a similar pattern to other forms of police recorded non-sexual violent crime. However, the changing profile of homicide cases and the relationship between changing characteristics of homicide and wider violence have not been previously examined in a Scottish context.

Aim of this research

The aim of the thesis is to examine the pattern and characteristics of homicide cases in Scotland and determine the extent to which changes in homicide reflect the changing pattern and characteristics of non-sexual violence.

In order to achieve this aim I will examine how the profile of homicide has changed over time by exploring different typologies of homicide cases. This will provide a more nuanced picture of what typical homicide cases exist and how these have changed over the time. The typologies of homicide will be compared with similar typologies of violence (using data from the Scottish Crime and Justice Survey) in order to examine if similar change over time can be observed. If so, changes in the profile of homicide cases could be regarded as a good indicator of the change in the profile of non-sexual crimes of violence more generally in Scotland.

Research methods

In order to examine the typologies of homicide I will use statistical grouping techniques to group together different cases of homicides depending on a variety of different variables. This may include: demographic characteristics of the victim and (if known) the offender; offender motive; type of weapon used; relationship between victim and offender; offender predispositions; vulnerabilities of the victim; crime scene variables; and other circumstances of the homicide incident.

Access request

Access to the Scottish Homicide Database is sought because it provides a unique resource through which to study the characteristics of homicide cases and determine how these have changed over time. There is no other data source in Scotland that will provide the rich level of information on the nature, circumstances and participants of homicide. This study would provide a valuable opportunity to model the data and could potentially be of value to Police Scotland in monitoring the changing nature of both homicide and non-sexual crimes of violence.

The intended purpose and use of the data is to produce a PhD thesis, produce academic publications in peer reviewed journals, present at academic conferences, seminars, or lectures, and for use in public engagement with audiences such as government, police or social work. The research will concentrate on homicide cases at an aggregate level and so details of individual cases will not feature at all in the analysis. All written work produced as a result of this research will be anonymized and draft copies of reports or presentations will be sent to Police Scotland for official clearance prior to publication or dissemination. We undertake to comply with any other conditions of access.

Timescales

This research will be conducted as part of the Applied Quantitative Methods Network (AQMeN) programme of research through a PhD studentship funded by the University of Edinburgh. The studentship began in September 2014 and is due to be completed by August 2017. The research fieldwork is due to commence in June 2015; therefore, it would be desirable to have access to the data granted by then. Access is requested for myself (as the PhD student) and my two supervisors: Professor Susan McVie and

Dr Paul Norris, who will give guidance and advice throughout the research regarding the analysis.

Benefits of this research

The results of this study would be useful in several ways. Firstly, it will provide a valuable insight for the police, Scottish Government and other relevant organisations as to how the characteristics of homicide have changed over time. Secondly, if the results of the thesis demonstrate that homicide and violence indeed follow a similar pattern, homicide could be used as a form of barometer for violence in Scotland. This knowledge would be beneficial in terms of directing policy or resources to where they are most needed. Since the majority of homicide cases come to the attention of the police (which is less true for other forms of violence), and homicide as a crime is less likely to be legally changed in comparison to other violent crimes (UNODC, 2013), homicide could be regarded as a much more robust indicator of violence within a society. This would mean that the changing profile of violence in Scotland could be monitored using homicide data and the planning of resources and initiatives to prevent further violence could be done more efficiently.

Sara Skott

References

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Soothill, K., Francis, B., Ackerley, E. & Collett, S. (1999) *Homicide in Britain: A Comparative study of Rates in Scotland and England and Wales*. Edinburgh: Scottish Executive Central Research Unit. Gathered 2nd of February 2015 from: <http://www.scotland.gov.uk/Publications/2000/03/2ff917ae-270d-47d9-acd0-f89c30688868>

UNODC. (2013). *Global Study on Homicide 2013*. United Nations Office on Drugs and Crime: United Nations.

SCHEDULE TWO

THE POLICE DATA

- 1.1 The Police Data will be provided to the University Researcher in the form of a MS Excel Spread sheet, extracted from the Scottish Homicide Database.
- 1.2 The Police Data to be provided will cover the period agreed and will be in respect of all murders occurring in the specified Police Scotland area during the said period.
- 1.3 The datasets derived from the Original Data are referred to as 'the **Working Data**'. Those encrypted Folders that may be accessed only by the Nominated Personnel are referred to as 'the **Designated Folders**'.
- 1.4 The Original Data and Working Data will be held in an encrypted folder on a secure server to which only members of the Nominated Personnel will have access via password protection. The server and network drive will be security protected using appropriate firewalls.
- 1.5 Transfer of Original Data will be direct to the nominated personnel once received it will be save onto the server as per 1.4 above. The data will be transferred via a datashur© encrypted USB which will be hand-delivered to the nominated personnel's premises by Police Scotland staff. The data will be transferred either by or in the sight of Police Scotland Staff who will retain the USB.
- 1.6 The Original Data will only be located on the aforementioned remote server. It will not at any time, nor in any circumstances, be transferred to the hard disks of individual PCs or laptops, or any other portable storage device (such as memory sticks, DVDs etc).

- 1.7 Once received by the Principal Investigator the Original Data files will be further anonymised where possible by the Nominated Personnel and converted into a format suitable for analysis.
- 1.10 Whenever temporary data files need to be created (e.g. batch files created for the purposes of statistical estimation) they will only be stored in the same manner detailed above where this is absolutely necessary and will be deleted immediately once the estimation algorithm is completed.
- 1.11 Outputs of the analysis will be almost entirely statistical and aggregate in nature (tables of means, standard deviations, regression coefficients etc.). At no time will individual records from the Working Data or Original Data be printed out or distributed or stored anywhere other than on the Secure Server.
- 1.12 Graphs of data will not reveal information on individuals or individual neighbourhoods.
- 1.13 Graphs/maps of Police Data or any other form of the Police Data will not be produced without prior written permission from Police Scotland.
- 1.14 Responsibility for ensuring the safekeeping of the Police Data lies with the University.
- 1.15 No undertaking or guarantee is given by the Chief Constable as to the amount of Police Data that may from time to time be made available to the University under this Minute of Agreement.

Appendix 4.4: Ethics form for research

LEVEL 1 FORM

Research Ethics Self-Audit

School of Law

College of Humanities & Social Sciences

University of Edinburgh

This audit is to be conducted by the investigator (for undergraduate and postgraduate students by the student and supervisor in discussion). Complete this form IF you intend to conduct empirical research (in the senses outlined in the School’s draft ethical policy), gather and/or store personal data on living or recently deceased persons, or utilize any information not otherwise in the public domain from which individuals might in principle be identified. If in doubt complete the form, and **consult the School’s ethical policy before completing this form.**

1 THE RESEARCHERS & PROJECT	
Name and Position	Sara Skott Bengtsson, PhD student
Name of supervisor (if appropriate)	Professor Susan McVie, Dr Paul Norris
Title of Research	The Relationship Between Homicide and Serious Violence in Scotland.
Funder	School of Law
Time Scale	September 2014- August 2017
Project Team	Not applicable

<p>Project Summary (including details of Methodology, not more than 250 words)</p>	<p>The aim of the study is to examine changing patterns and characteristics of homicide in Scotland and to determine the extent to which changes in homicide reflect the changing pattern and characteristics in serious violence. The aim will be addressed by five research questions: 1) What subtypes of homicide with similar characteristics can be identified? 2) How has the mix of homicide subtypes changed over time? 3) What subtypes of serious violence with similar characteristics can be identified? 4) How has the mix of violence subtypes changed over time? 5) How does the change in homicide reflect the overall change in violence, if at all?</p> <p>The research strategy will be quantitative, and the study will be based on secondary data from the Scottish Crime and Justice Survey and the Scottish Homicide Database. Data from the SCJS is subject to disclosure control and openly accessed. Access negotiations regarding the Scottish Homicide Database have been initiated with Police Scotland. All data used will be at the aggregate level and anonymised without the possibility of identification of any particular individual. The anonymised homicide data will be retrieved at the Scottish Crime Campus in Gartcosh, and the SCJS data will be retrieved from the UK data service. All data will be stored on a password-protected university server, only accessed by the researcher of the current study.</p>
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2 RISK OF HARM	
Is there significant foreseeable risk of physical or emotional discomfort or harm to the participant?	No
Could this research adversely affect participants in any other way?	No
Is there significant foreseeable risk of physical or emotional discomfort or harm to the researcher?	No
<i>If you answered 'YES' to any question in this Section, you must complete a Level 2 Form.</i>	
3 CONSENT & CONFIDENTIALITY	
Can you affirm that all reasonable steps have been taken to ensure that anyone participating in your research has given their informed consent?	Yes
Can you give undertakings of confidentiality and anonymity to anyone who participates in your research <i>without exception</i> ?	Yes
Can you affirm that there are no problems regarding data storage and handling, and that your practice will comply with University Data Protection procedures (See www.recordsmanagement.ed.ac.uk)?	Yes
If personal data about respondents is taken and held, can you affirm that you have taken all reasonable steps to ensure the security of this personal data, including compliance with University Data Protection procedures (See www.recordsmanagement.ed.ac.uk)?	Yes
Can you affirm that there are no special issues relating to consent or confidentiality in this case?	Yes

<i>If you answered 'NO' to any question in this Section, you must complete a Level 2 Form.</i>	
3 CONFLICTS OF INTEREST	
Can you affirm that, to the best of your knowledge and belief, no institutional or personal conflicts of interest arise from this research?	Yes
Can you affirm that you're objectivity or independence is not compromised due to financial or non-financial benefits for yourself or for a person in close proximity?	Yes
Can you affirm that no 'special moral difficulties' arise from the methods adopted? ¹⁰¹	Yes
<i>If you answered 'NO' to any question in this Section, you must complete a Level 2 Form.</i>	

I confirm that:

- I have reviewed and understand the School of Law Policy on Research Ethics;
- I have reviewed and understand the School of Law Research Ethics Primer;
- am aware of the CHSS Research Ethics Framework,

and that my view, after having conducted this ethics self-audit, is that there are NO REASONABLE FORESEEABLE ETHICAL RISKS associated with this research.

Signed: **Sara Skott Bengtsson**

¹⁰¹ Special moral challenges might arise, for example, where the purposes of research are concealed, where respondents are particularly vulnerable or are unable to provide informed consent, or where research findings impinge negatively/differentially upon the interests of participants.

Dated: 04.05.2015

Appendix 4.5: Distribution of Police Scotland divisions merged into the legacy Police forces

Table 4.12: Distribution of homicide cases in each legacy police force

Legacy Police force	Includes Police Scotland division:
Strathclyde	Strathclyde includes 41 cases from the Police Scotland Division G, 12 cases from Police Scotland Division K, 12 cases from Police Scotland Division U, 3 cases from Police Scotland Division L, and 18 cases from Police Scotland Division Q after 1 st of April 2013.
Lothian and Borders	Lothian and Borders includes 11 cases the Police Scotland Division J and 13 cases from the Police Scotland Division E after 1 st of April 2013.
Tayside	Tayside includes 7 cases from Police Scotland Division D after 1 st of April 2013.
Grampian	Grampian includes 4 cases from the Police Scotland Division A and 2 cases from the Police Scotland Division B after 1 st of April 2013.
Fife	Fife includes 12 cases from the Police Scotland Division P after 1 st of April 2013.
Central	Central includes 5 cases from Police Scotland Division C after 1 st of April 2013.
Northern	Northern includes 1 case from the Police Scotland Division N after 1 st of April 2013.
Dumfries and Galloway	Dumfries and Galloway includes 2 cases from the Police Scotland Division V after 1 st of April 2013.
Other	One case was committed within the Essex Police Force but is still included in this dataset since this was one of three victims connected to the same overarching case, committed in Scotland. This case was originally treated as a missing person case and was therefore treated

as a separate case from the other two victims
until the body was recovered much later.

Note 1: Source: SHD. Base: n=2400.

Appendix 4.6: List of variables with amended missingness

The following changes were made after consulting with Police Scotland (Police Scotland, personal communication, July 2015).

Type of weapon: missingness in the last three year groups was recorded as ‘no weapon used’ (as in physical force was used).

Victim and offender ethnicity: missingness was recoded as ‘white’ in the final three year groups. This is since they take care to record whether the offender is of another ethnicity (so these cases are ‘correctly coded’), however, cases with white people might not be filled in. So all the missing for the three last year groups are white.

Victim and offender residential status: All of the missing cases in year group 4 and 5 can be recoded as ‘had a recorded home address at the time of crime’, this since the police would take extra care to record the homeless cases.

Victim influence status: If the victim was a child (under 10 years old) the missing value was recoded into ‘not under the influence’ in the last two year groups. Only the last two year groups were recoded due to problems with the definition of ‘being under the influence’ in previous year groups.

Offender influence status: If this variable was missing in the last two year groups, it was recorded into ‘unknown’.

Indictment: All the missing was recoded as ‘murder’. This variable was only ticked when it is changed from the recorded crime (or if there was an appeal), so all missing was really murder.

Relationship: This variable was missing for all cases except for the homicides occurring between 2013-2015, which had been coded by the Homicide Governance and Review Team. The relationship variable consequently had to be constructed manually to amend for this missingness and the following sources were used in order to reconstruct this variable:

- 1) A binary variable of ‘stranger’ indicating whether the homicide was a stranger homicide or not. If the variable ‘stranger’ was coded as ‘yes’, the relationship was coded as ‘stranger’.

- 2) The variables measuring motives:
 - a. If the motive was coded as 'domestic', the relationship was coded as 'partner/spouse or ex-partner'
 - b. If the motive was coded as 'feud', the relationship was coded as 'rival'
 - c. If the motive was coded as 'jealousy/vengeance', the relationship was coded as 'other known person' unless it became evident from other sources the more exact nature of the relationship.
- 3) A document from Strathclyde Police in 1996 containing information about the relationship between offender and victim for all their cases, manually transferred into the dataset.
- 4) An open field variable providing textual information about a case called 'Homicide Synopsis' was studied on a case by case basis in order to examine whether the relationship between offender and victim was noted. If so, this was manually transferred into the dataset.



Data Sharing Agreement

For the necessary sharing of data between

**Scottish Government, Justice Analytical
Services (JAS)**

And

the University of Edinburgh

a charitable body registered in Scotland under registration number SC005336, incorporated under the Universities (Scotland) Acts and having its main administrative offices at Old College, South Bridge Edinburgh, EH8 9YL

("University of Edinburgh")

1. Introduction

Organisation/Business Area	Scottish Ministers (Scottish Government)
Information Asset Owner (IAO) (if applicable)	Nicola Edge
Operational Contact Name	Neil Grant
Operational Contact Job Title:	Statistician

2. Organisations involved in the Data Sharing

Organisation/Business Area	Scottish Ministers (Scottish Government)
Information Asset Owner (IAO) (if applicable)	Nicola Edge
Operational Contact Name	Neil Grant
Operational Contact Job Title:	Statistician
ICO Registration Number:	Z4857137

Organisation/Business Area	The University of Edinburgh
Information Asset Owner (IAO) (if applicable)	
Operational Contact Name:	Prof. Susan McVie
Operational Contact Job Title:	Chair of Quantitative Criminology, School of Law
ICO Registration Number:	N/A

3. Purpose(s) of the data sharing

3.1 Purpose(s)

1. The data will be used for the purpose of research only. This research is being undertaken as part of the SGSSS internship work as well as for the doctoral research for the PhD project of Sara Skott using a pooled dataset of the Scottish Crime and Justice Survey (SCJS).
2. The data sharing initiative is necessary because the pooled dataset, containing combined dataset from 5 different sweeps (2008-09, 2009-10, 2010-11, 2012-13 and 2014-15) is not available as standard on the SCJS datasets which are released to the UK Data Service. This dataset therefore has to be requested separately.
3. The overall aim of the current project is to gain a deeper understanding of violence in Scotland. This will be done by examining the victims, the offenders and the incident-level variables of the SCJS reported violence in a combined dataset covering multiple sweeps of the SCJS. This research will provide a more detailed picture of violence in Scotland than has previously been found by identifying different types of violence over time.

3.2. Aims & Benefits

The aim of this analysis is to identify different types of violent crimes in Scotland and to examine how these have changed over time (between 2008 and 2015). This research will be part of an SGSSS internship Sara Skott is undertaking with JAS, as well as being part of the doctoral research Sara Skott is undertaking for her PhD thesis.

This research holds valuable implications for policy. Not only will this research result in a deeper and more detailed understanding of violence in Scotland, but if different distinguishable types of violence can be identified in the data, this might be relevant for the policies around violence. Different types of violence might be related to different causes or risk factors of violence, which are important to understand in its own right, but which might also be relevant for preventing violence. If there are certain types of violence that are very different from each other, different policies might be required in order to prevent them. This project is therefore designed to try to outline different types of violence in order to help inform violence policy as well as to get a deeper understanding of this crime as a whole in Scotland.

This work is also part of a bigger research project that forms my (Sara Skott) PhD thesis of. The aim of the PhD thesis is to examine the pattern and characteristics of homicide cases in Scotland and to determine the extent to which changes in homicide reflect the changing pattern and characteristics of violence. In order to achieve this aim I will examine how the profile of homicide and violence has changed over time by identifying subtypes of homicide as well as subtypes of violent crimes. These subtypes will then be compared over time in order to answer the question of how homicide relate to other forms of violent crime in Scotland. The homicide data has been collected and analysed separately. Hopefully, the work proposed in the current access agreement will be beneficial for the research relating to the thesis as well.

3.3 Limitations on Use

The University of Edinburgh are restricted from further linkage of the data with other datasets that could lead to an inappropriately detailed and privacy intrusive record of an individual.

3.4 Further Disclosure

The disclosure of the data with any third party should be agreed with the Scottish Government.

4. Description of study

4.1 Internship project plan

Background

The Justice Strategy for Scotland¹⁰² includes a priority for tackling violence in all its forms. The Scottish Government policy team coordinates the work to reduce violence, and this approach is informed by detailed and reliable evidence on the scale and nature of violence in Scotland, to ensure that it has a good understanding of the nature of the problem that can inform the approach taken to reduce it.

The Scottish Crime and Justice Survey (SCJS) is an incredible useful data source with great potential for interesting and relevant analysis of violence. Unfortunately there has not been that many great opportunities to carry out any deeper level analysis of violence in Scotland using this dataset. This internship project aims to fill this gap in the work with the SCJS and to provide a more detailed analysis of violence in Scotland.

Aim of Project

The overall aim of the current project is to gain a deeper understanding of violence in Scotland . This will be done by examining the victims, the offenders and the incident-level

¹⁰² <http://www.gov.scot/Resource/0040/00401836.pdf> (pp 44-45)

variables of the SCJS reported violence in a combined dataset covering multiple sweeps of the SCJS. In order to fulfil this aim, several research questions will be answered;

- What are the descriptive features of violence in Scotland?
- Can different types of violence be identified in the data, and if so what do they look like?
- How have these types of violence changed over time?
- What are the policy implications of this?

Methods

Due to insufficient sample sizes for violence in any one sweep of the SCJS, data from the 2008-09, 2009-10, 2010-11, 2012-13 and 2014-15 datasets will be combined into one big dataset, allowing for more sophisticated and statistically more robust analysis. Descriptive features of this combined dataset will be mapped out before this dataset will be subjected to a Latent Class Analysis (LCA). LCA is a probabilistic clustering technique that is designed to find underlying groups in the data. By specifying the variables of interest, the LCA will identify a number of different types of violence in the data that are as similar as possible within the groups regarding those variables, but as different as possible between groups.

By using this technique on the violence data, different types of violent crimes will be identified using variables relating to the victim, the offender and to the incident of violence itself. The types identified will in other words be derived from the data, and not from any previous preconceptions made by the researcher. This means that the types of violent crimes identified in this data will be a reflection of underlying types of violence in Scotland, and will therefore provide policy makers and practitioners with more precise information about the types of violence that exists and their relative impact.

Although the dataset will be combining multiple sweeps of the SCJS, these groups of violence can be examined over time. If time (measured as years of the sweep) is introduced as a covariate in the LCA model, these groups can be compared over time. This would enable us to see whether or not certain types of violence have become more or less prevalent over time, answering the question of how violence have changed over time in Scotland.

Time scale

The internship will last for three months, starting on August 15th 2016 and ending on November 11th 2016. The data analysis relating to the internship project will be conducted during this time. The doctoral research will be undertaken until November 2018 when the

time period for the PhD ends. The entire research project proposed in this application will therefore conclude in November 2018.

Output

The work will result in the following outputs;

- 1) a final report, formatted for possible publication the SG social research series
- 2) a separate technical report describing the process in more detail including the dataset, the outputs, the decisions taken throughout the project,
- 3) SPSS datasets and output files for any follow-up
- 4) a presentation/discussion with analysts and policy leads.

The research will concentrate on incidents of violence at an aggregate level and so details of individual cases will not feature at all in the analysis and individuals will not be identifiable in any published result or analysis.

Implications

This research holds valuable implications for policy. Not only will this research result in a deeper and more detailed understanding of violence in Scotland, but if different distinguishable types of violence can be identified in the data, this might be relevant for the policies around violence. Different types of violence might be related to different causes or risk factors of violence, which are important to understand in its own right, but which might also be relevant for preventing violence. If there are certain types of violence that are very different from each other, different policies might be required in order to prevent them. This project is therefore designed to try to outline different types of violence in order to help inform violence policy as well as to get a deeper understanding of this crime as a whole in Scotland.

4.2 PhD Research Plan

Background to the research

Ten years ago Scotland gained the unenviable reputation as being 'the most violent country in the developed world' (BBC News, 18th September 2005) following the publication of a UN report. Previous research also found that Scotland had a high homicide rate in comparison to England and Wales (Soothill, Francis, Ackerley and Collett, 1999). Over the last decade, however,

rates of non-sexual violent crime and homicide in Scotland have declined significantly (Scottish Government, 2014). It would appear that homicide rates have followed a similar pattern to other forms of police recorded non-sexual violent crime. However, the changing profile of homicide cases and the relationship between changing characteristics of homicide and wider violence have not been previously examined in a Scottish context.

Aim of this research

The aim of the thesis is to examine the pattern and characteristics of homicide cases in Scotland and to determine the extent to which changes in homicide reflect the changing pattern and characteristics of violence. In order to achieve this aim I will examine how the profile of homicide and violence has changed over time by identifying subtypes of homicide as well as violent crimes. These subtypes will then be compared over time in order to answer the question of how homicide relate to other forms of violent crime in Scotland.

Research methods

In order to compare homicide with the violence over time I will use statistical grouping techniques (Latent Class Analysis) to identify a typology of homicide cases and a typology of violence cases respectively. The homicide data has already been accessed through the Scottish Homicide Database held by Police Scotland. These two typologies will then be compared across time to determine if groups of homicide and violence follow a similar pattern over time.

Access request and objectives

The pooled dataset of data from five different sweeps (2008-09, 2009-10, 2010-11, 2012-13 and 2014-15) of the SCJS, has not been publicly released and special access to use this dataset for the research outline above and is therefore sought. The pooled SCJS dataset provides a unique resource through which to study the characteristics of violence in Scotland. Research has found victimisation measures of violence to be more reliable compared to police recorded crime (Van Dijk, Van Kesteren & Smit, 2007), and the SCJS would therefore constitute the best possible dataset for this research. The intended purpose and use of the data is to produce a PhD thesis, produce academic publications in peer reviewed journals, present at academic conferences, seminars, or lectures, and for use in public engagement with audiences such as government, police or social work. The research will concentrate on incidents of violence at an aggregate level and so details of individual cases will not feature at all in the analysis.

Timescales

This research will be conducted as part of the doctoral research undertaken by Sara Skott for the requirements for a PhD. The doctoral research will be undertaken until November 2018

when the time period for the PhD ends. The entire research project proposed in this application will therefore conclude in November 2018.

Benefits of this research

The results of this study would be useful in several ways. Firstly, it will provide valuable insights for the police, Scottish Government and other relevant organisations as to how the characteristics of homicide and violence have changed over time. Secondly, if the results of the thesis demonstrate that homicide and violence indeed follow a similar pattern, homicide could be used as a form of barometer for violence in Scotland. This knowledge would be beneficial in terms of directing policy or resources to where they are most needed. Since the majority of homicide cases come to the attention of the police (which is less true for other forms of violence), and homicide as a crime is less likely to be legally changed in comparison to other violent crimes (UNODC, 2013), homicide could be regarded as a much more robust indicator of violence within a society. This would mean that the changing profile of violence in Scotland could be monitored using homicide data and the planning of resources and initiatives to prevent further violence could be done more efficiently.

5. Data to be shared

Data from the victim forms, main questionnaire and self-completion questionnaire for a pooled dataset containing data from the following five sweeps will be shared following statistical disclosure control, applied to safeguard the confidentiality of the information held about individuals:

- Scottish Crime and Justice Survey 2008/09
- Scottish Crime and Justice Survey 2009/10
- Scottish Crime and Justice Survey 2010/11
- Scottish Crime and Justice Survey 2012/13
- Scottish Crime and Justice Survey 2014/15

This pooled dataset has already been created by JAS.

6. Process for Sharing

6.1 Transfer of data

The specified data will be provided by Justice Analytical Services to Edinburgh University via the transference of a SPSS file into a secure folder on the University of Edinburgh secure server. This secure folder is password protected and can only be accessed by Sara Skott and maintenance support of the university.

The process of transferring the files to Sara's work laptop is as follows:

- 1) put the SPSS files into a secure USB drive.
- 2) while in the Victoria Quay building, plug in the USB to the password protected work laptop of Sara Skott.
- 3) Save the SPSS files into an encrypted (password protected) folder on the work laptop.
- 4) a backup copy of the files will be saved in the personal folder of the secure server of the university of Edinburgh, following this process:
 - A safe (password protected) VPN access is set up between Sara Skott's work laptop and the university server.
 - The data will then be transferred from the encrypted folder on the work laptop to personal folder on the Edinburgh server using the VPN access.
 - The personal folder on the Edinburgh server is also encrypted (password protected) and can only be accessed by Sara Skott and maintenance staff of the university.
- 4) no data will be sent or transferred from the work laptop or Edinburgh server without the authorisation of SG.
- 5) No data will be saved outside the encrypted folders.

7. Basis for Sharing

7.1 Legal Basis

The Scottish Government has the implied power to share this data which is necessary for the administration of the functions of government. The Scottish Government is a producer of Official Statistics and bound by the Statistics and Registration Services Act 2007, which establishes the Code of Practice (CoP) for Official Statistics (section 10). This requires us to:

- Meet user needs, as defined under principle 1 of the CoP, including: dissemination of official statistics to meet the requirements of informed decision making by government, public services, business, researchers and the public and to maximise public value.
- Make statistics available to all users, as in principle 8 of the CoP, including: make statistics available in as much detail as is reliable and practicable, subject to legal and confidentiality constraints and ensure that official statistics are disseminated in forms that enable and encourage analysis and re-use.

8. Data Protection Act

The data is processed under condition 6(1) of Schedule 2 of the Data Protection Act (for the purposes of legitimate interests pursued by the data controller or by the third party or parties to whom the data are disclosed, except where the processing is unwarranted in any particular case by reason of prejudice to the rights and freedoms or legitimate interests of the data subject).

In addition, the data is shared for statistics and research purposes under the section 33 exemption. The data will not be processed to support measures or decisions with respect to particular individuals and the data will not be processed in a way which causes substantial damage or distress to any data subject.

9. Information Assurance & Security

9.1 Personnel Security

The only individuals who will have access to the data are: Sara Skott, Susan McVie, and Paul Norris:

- Professor Susan McVie who has worked with SCJS data for over 20 years and has expertise in analysis of survey and linked datasets;
- Dr Paul Norris who has also worked extensively with SCJS data and has published papers using complex analysis of the data; and
- Sara Skott who is a PhD researcher at the School of Law at the University of Edinburgh, funded by AQMeN and the School of Law. Her doctoral research concerns homicide and serious violence and she has been working with homicide data from the Scottish Homicide Database held by Police Scotland. Susan McVie and Paul Norris are Sara Skott's PhD supervisors.

9.2 Physical Security

The University of Edinburgh has a robust set of procedures and standards in place for ensuring secure storage for data. Access to personal data servers as well as AQMeN data servers is severely restricted and only those with specific permissions will be allowed access to analyse the data. Password protection will be used for all folders containing data files. The data are already anonymised and analysis will only be undertaken at an aggregate level which will not permit disclosure of information that could potentially identify any individual. An audit trail will be maintained through strict usage of syntax files.

9.3 Technical Security

The data will be held on a secure data server accessible only by those individuals named in this application. The folders in which these data will be held will be password protected. The data will be used during the period from August 2016 to November 2018¹⁰³ for the purposes of our research, and then held for a further 1 year to allow for further analysis if required during the peer review process. The data will be permanently deleted from the data server by end November 2019.

The University of Edinburgh IT security procedures will be adopted and adhered to at all times.

9.4 Management of a Security Incident

JAS should be notified immediately of any security incidents / data losses. JAS and the University of Edinburgh should report these through the appropriate procedures in their organisations. In the event of a security incident, appropriate action will be taken, e.g. requiring the immediate deletion of the dataset. Depending on the severity of the breach, JAS may exclude the University of Edinburgh from future data sharing or impose additional conditions in any future data sharing agreements.

9.5 Disclosure Protection

The University of Edinburgh will apply the supplied methods and standards below for disclosure control for any outputs released beyond the research team.

¹⁰³ This is the duration of the doctoral studies conducted by Sara Skott

Supplied methods and standards:

(i) The University of Edinburgh will ensure that individuals, households or organisations cannot be identified. In particular, results based on very small numbers should be avoided. In line with the approach taken in the SCJS reports, results should not be presented where the unweighted base is below 50 respondents.

(ii) if there is a risk of disclosure due to low n on certain variables these variables will either be excluded or recoded in order to prevent this. Ethnicity will for instance be recoded into 'white' and 'not white' to prevent identification of individuals of ethnic minorities.

10. Information Management

10.1 Freedom of Information (FOI) and Environmental Information (EIR) Requests

FoI requests for the individual information shared are generally expected to be exempt under the personal information element of the Act (section 38 and regulation 11 of EIR). However, all such requests will be considered with respect to both the FoI Act and the Data Protection Act and decisions will be taken in line with those provisions. Should an FoI request be received by The University of Edinburgh in relation to the data provided by JAS, they will immediately make JAS aware of the request and handling of the request will be agreed by all organisations.

FoI requests received by The University of Edinburgh for non-disclosive analysis based on the data shared by JAS will be handled as per their existing FoI procedures.

10.2 Subject Access Requests (SAR)

Statistics and Research is exempt from these requests under section 33 of the data protection act.

10.3 Privacy Impact Assessment (PIA)

A Privacy Impact Assessment has been carried out to assess the risks to privacy posed by the work required to complete this project.

Retention & Deletion

Data will then be held until November 2019 when data will be permanently deleted from the data server at Edinburgh University.

11.Management of Agreement

11.1 Commencement

This agreement will commence in August 2016.

11.2 Duration

This research analysis will be undertaken between August 2016 and November 2018. Data will be held until end November 2019 to facilitate the academic peer review process.

11.3 Review & Changes to Agreement

The University of Edinburgh should notify the Scottish Government by email of any changes to this project (e.g. staff changes) that would affect this agreement.

11.4 Closure of Agreement

The agreement will close at end November 2019.

12. Signatories

By signing this Agreement the Parties confirm that they accept its terms.

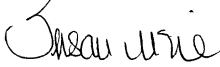
Organisation/Business Area: Scottish Government Justice Analytical Services

Information Asset Owner (IAO) Name: Nicola Edge

Signature..... Date

Organisation/Business Area: ...University of Edinburgh, School of Law

Information Asset Owner (IAO) Name: ...Professor Susan McVie.....



Signature.....

..... Date...25 Sept 2016

Appendix A – Privacy Impact Assessment (PIA)

1. Introduction

The purpose of this document is to report on and assess against any potential Privacy Impacts as a result of the sharing of the pooled SCJS data with the University of Edinburgh.

2. Document metadata

2.1 Name of Project – *Violence over time in Scotland; SCJS data from 2008/09 to 2014/15.*

2.2 Date of report

5th September 2016.

2.3 Author of report

Sara Skott, PhD researcher, University of Edinburgh

2.4 Information Asset Owner (IAO) of relevant business unit

Nicola Edge, Head of Division, Justice Analytical Services.

2.5 Date for review of Privacy Impact Assessment (PIA)

If required.

3. Description of the project

3.1 Detailed description of the work you are about to undertake. Include information on ownership and governance, and the planning and reporting mechanisms, with particular attention to risk management and reporting.

The data will be used for the purpose of research only. This research is being undertaken as part of the SGSSS internship work as well as for the doctoral research for the PhD project of Sara Skott using a pooled dataset of the Scottish Crime and Justice Survey (SCJS). The data sharing initiative is necessary because the pooled dataset, containing combined dataset from 5 different SCJS sweeps (2008-09, 2009-10, 2010-11, 2012-13 and 2014-15) is not available as standard of the SCJS datasets which are released to the UK Data Service. This dataset therefore has to be requested separately.

The overall aim of the current project is to gain a deeper understanding of violence in Scotland. This will be done by examining the victims, the offenders and the incident-level variables of the SCJS reported violence in a combined dataset covering multiple sweeps of the SCJS. This research will provide a more detailed picture of violence in Scotland than has previously been found by identifying different types of violence over time. Not only will this research be beneficial because it will result in a deeper and more detailed understanding of violence in Scotland, but if different distinguishable types of violence can be identified in the data, this might be relevant for the policies around violence.

This analysis will result in the following outputs:

- a final report, formatted for possible publication in the SG social research series
- a separate technical report describing the process in more detail including the dataset, the outputs, the decisions taken throughout the project
- SPSS datasets and output files for any follow-up
- a presentation/discussion with analysts and policy leads
- analysis utilised in the doctoral thesis by Sara Skott as part of her PhD studies

The methodology that will be applied includes latent class analysis and multilevel modelling, in order to take account of the underlying latent nature of types of violence over time in Scotland.

3.2 Describe the personal data to be processed.

The following dataset will be requested following statistical disclosure control, applied to safeguard the confidentiality of the information held about individuals:

Scottish Crime and Justice Survey pooled dataset from 2008/09 – 2014/15 (total of five sweeps) main data file and victim data file

3.3 Describe how this data will be processed:

1. The data requested is data collected as part of the Scottish Crime and Justice Survey. The University of Edinburgh has requested a pooled dataset containing data from five sweeps (2008/09; 2009/10; 2010/11; 2012/13; 2014/15) of the survey.
2. The data will be securely transferred from the Scottish Government to the University of Edinburgh.
3. The data will be held on a secure data server accessible only by the University of Edinburgh Project Team: Sara Skott, Susan McVie, and Paul Norris. The folders in which these data will be held will be password protected.
4. The data will be managed by the University of Edinburgh project team and the Project Team are the only individuals who will have access to the data.
5. The data will be used during the period from August 2016 to November 2018 for the purposes of research, and then held for a further 1 year to allow for further analysis if required during the peer review process. The data will be permanently deleted from the data server by November 2019.

3.4 If this data is to be shared with internal or external partners, explain the legal basis for the sharing.

Legal Basis

The Scottish Government has the implied power to share this data which is necessary for the administration of the functions of government. The Scottish Government is a producer of Official Statistics and bound by the Statistics and Registration Services Act 2007, which establishes the Code of Practice (CoP) for Official Statistics (section 10). This requires us to:

Meet user needs, as defined under principle 1 of the CoP, including: dissemination of official statistics to meet the requirements of informed decision making by government, public services, business, researchers and the public and to maximise public value.

Make statistics available to all users, as in principle 8 of the CoP, including: make statistics available in as much detail as is reliable and practicable, subject to legal and confidentiality constraints and ensure that official statistics are disseminated in forms that enable and encourage analysis and re-use.

Data Protection Act

The data is shared for statistics and research purposes under the section 33 exemption of the Data Protection Act. The data will not be processed to support measures or decisions with respect to particular individuals and the data will not be processed in a way which causes substantial damage or distress to any data subject.

4. Stakeholder analysis and consultation

The main stakeholder for this project is the University of Edinburgh. The Project Team at the University will be given a draft PIA and a timeframe within which to offer any comments.

5. Conclusion

This Privacy Impact Assessment has been carried out to assess the risks to privacy posed by the work required to complete this project. It is assessed that the data sharing involved is capable of being fully compliant with relevant legislation.

6. Risks identified and appropriate solutions or mitigation actions proposed

Is the risk eliminated, reduced or accepted?

Risk	Ref	Solution or mitigation	Result Eliminate/reduce/accept
Anonymity and pseudonymity	1	<ul style="list-style-type: none"> • The data is already anonymised and analysis will only be undertaken at an aggregate level which will not permit disclosure of information that could potentially identify any individual. • Disclosure control has been applied to the variables in line with the disclosure controls applied to the SCJS data which has previously been deposited with the UKDA. • If there are variables with low n on certain values (such as ethnicity or certain age groups), these variables will be recoded in order to avoid possible identification. Ethnicity will for instance be recoded into 'white' and 'not white' rather than specific ethnic minorities. • The latent class analysis outputs will furthermore deal with groups of violent crimes (including 	accept

		variables relating to the victims, offenders and incident) and will not deal with individual victims. This means that individuals will not be identifiable in the data.	
Technology	2	<ul style="list-style-type: none"> • The data will be securely transferred to the University of Edinburgh. • The data will be held on a secure data server accessible only by the Project Team (Sara Skott, Susan McVie, and Paul Norris). The folders in which these data will be held will be password protected. The data will be used during the period from August 2016 to November 2018 for the purposes of our research, and then held for a further 1 year to allow for further analysis if required during the peer review process. The data will be permanently deleted from the data server by November 2019. • Access to data servers of the University of Edinburgh is severely restricted and only those with specific permissions will be allowed access to analyse the data. Password protection will be used for all folders containing data files. The data are already anonymised and analysis will only be undertaken at an aggregate level which will not permit disclosure of information that could potentially identify any individual. An audit trail will be maintained through strict usage of syntax files. 	accept
	3		Accept

Personal Data & Linkage		<ul style="list-style-type: none">• No linking of data will take place• Data are not identifiable.	
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8. Authorisation and publication

The PIA report should be signed by your Information Asset Owner (IAO). The IAO will be the Deputy Director or Head of Division.

Before signing the PIA report, an IAO should ensure that she/he is satisfied that the impact assessment is robust, has addressed all the relevant issues and that appropriate actions have been taken.

By signing the PIA report, the IAO is confirming that the impact of applying the policy has been sufficiently assessed against the individuals' right to privacy.

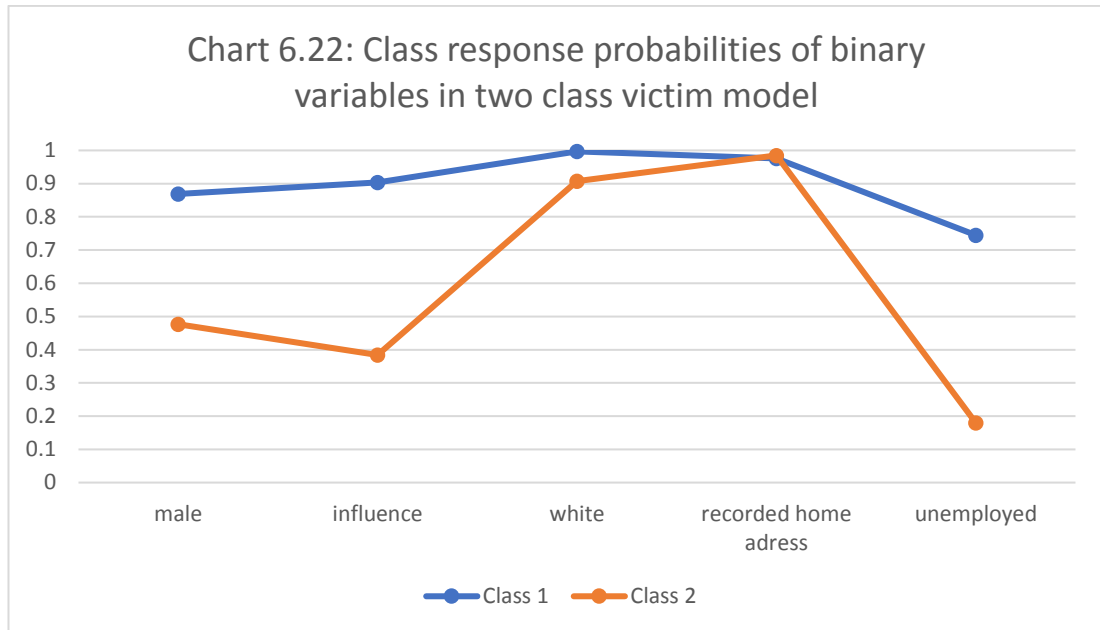
The results of the impact assessment must be published in the eRDM with the phrase "Privacy Impact Assessment (PIA) report" and the name of the project or initiative in the title.

Details of any relevant information asset must be added to the Information Asset Register, with a note that a PIA has been conducted.

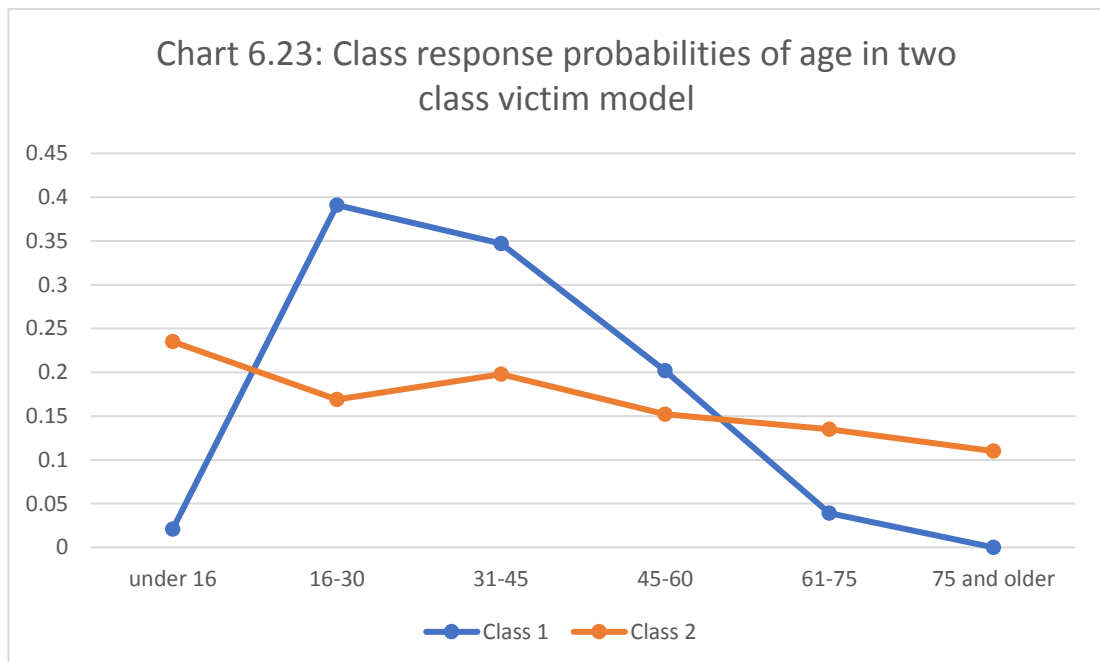
I confirm that the impact of undertaking the project has been sufficiently assessed against the needs of the privacy duty:

Name and job title of a Deputy Director or equivalent	Date each version authorised
Nicola Edge Head of Justice Analytical Services	

Appendix 6.1: Two-class victim model

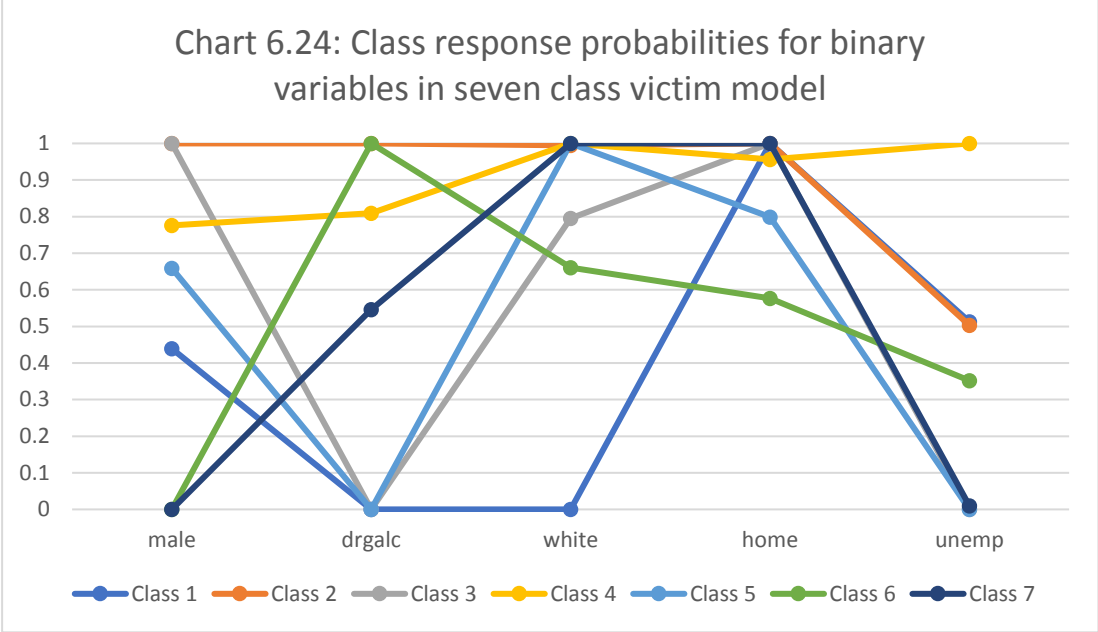


Note 1: Source: SHD. Base: n=2446.

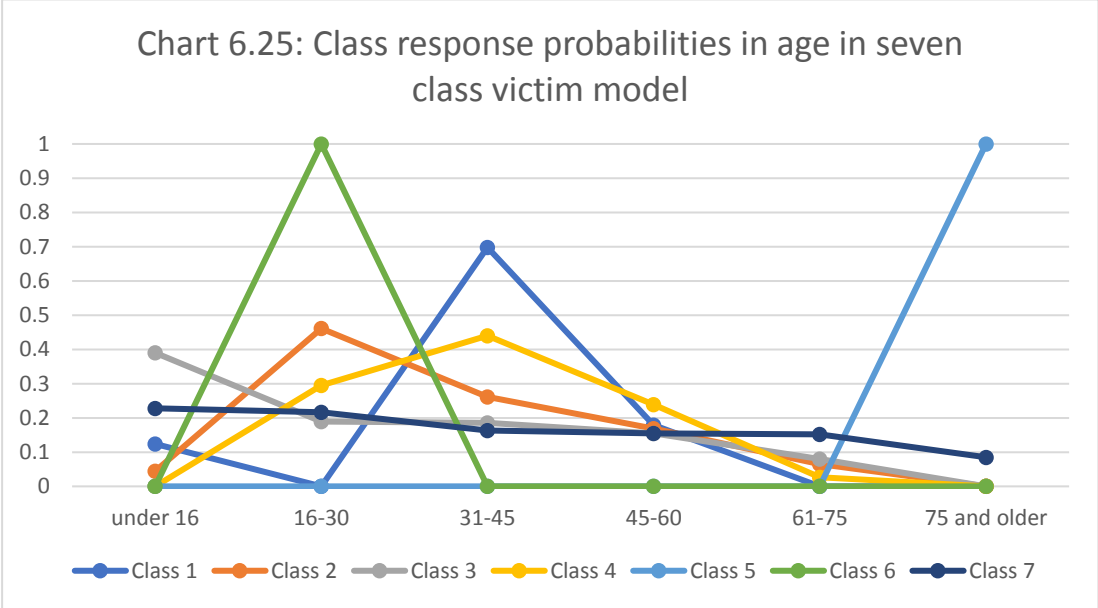


Note 1: Source: SHD. Base: n=2446.

Appendix 6.2: Seven-class victim model

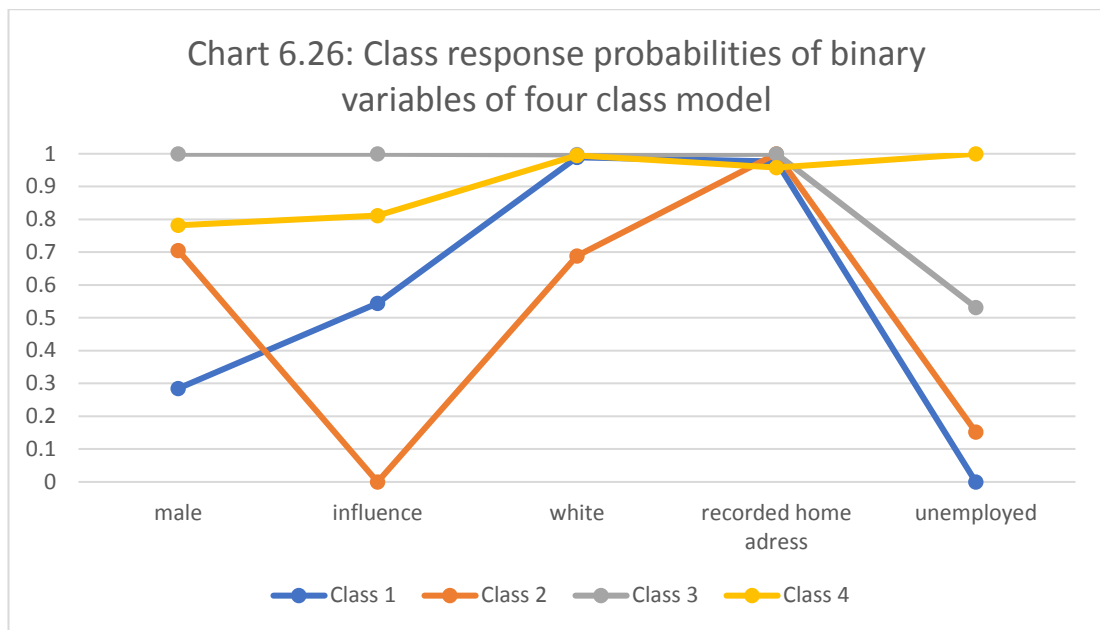


Note 1: Source: SHD. Base: n=2446.

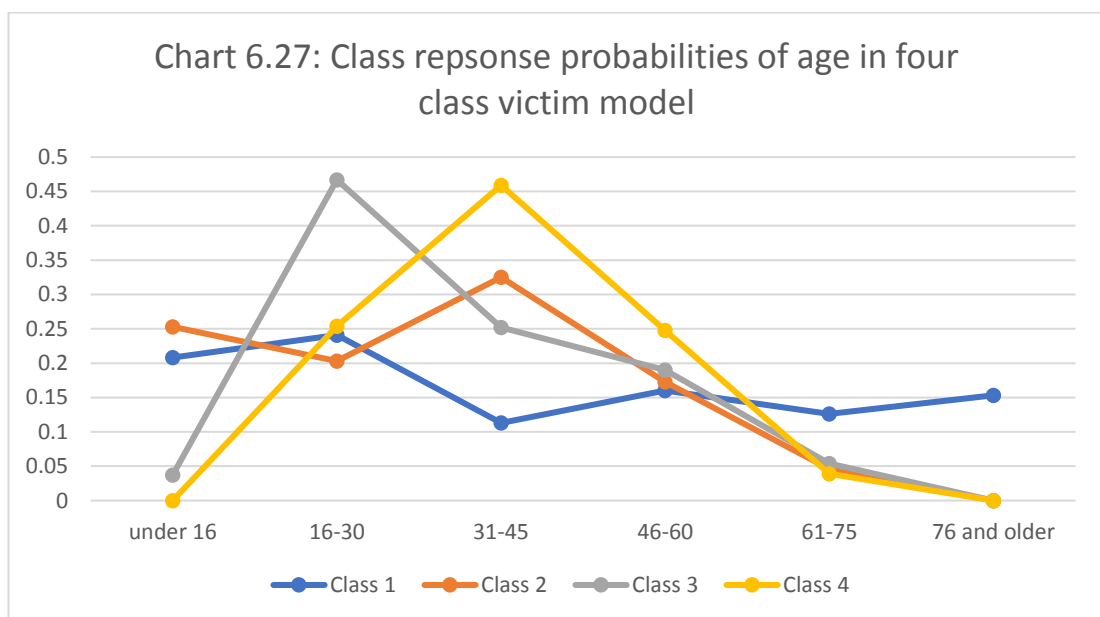


Note 1: Source: SHD. Base: n=2446.

Appendix 6.3: Four-class victim model 16-year dataset

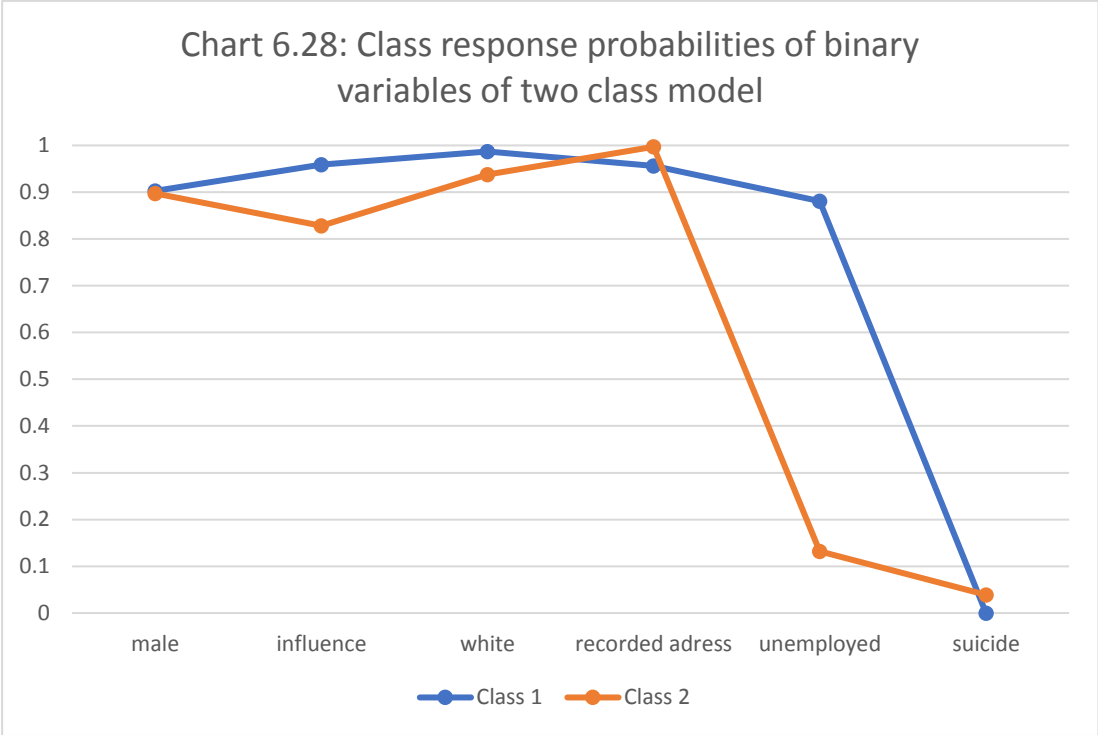


Note 1: Source: SHD. Base: n=1367.

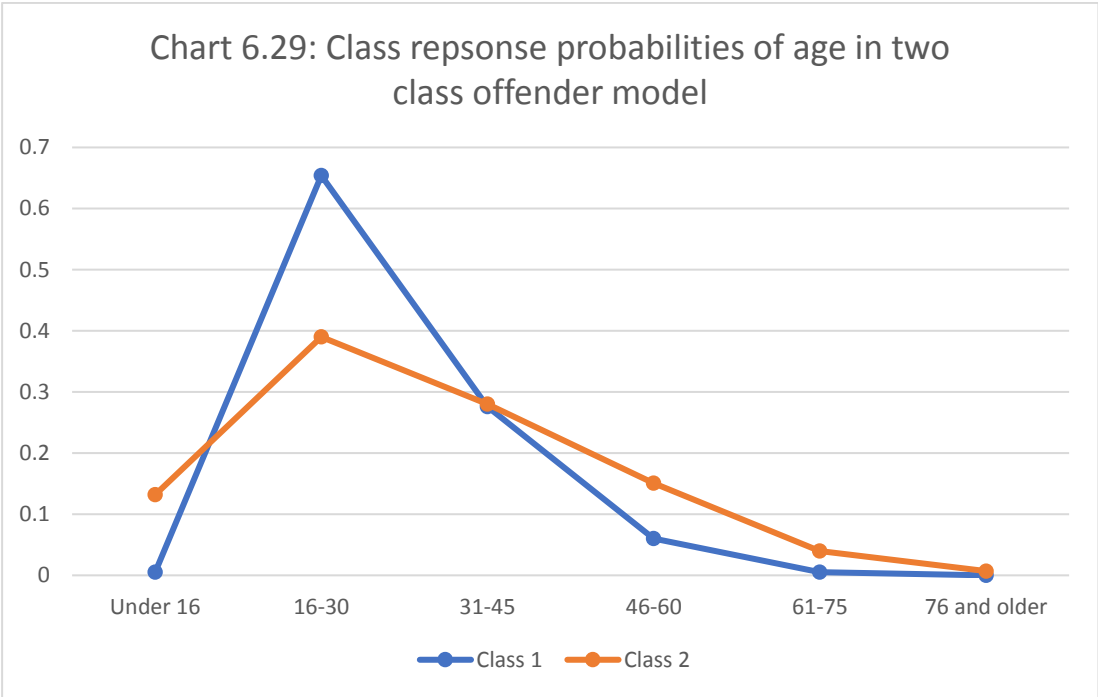


Note 1: Source: SHD. Base: n=1367.

Appendix 6.4: Two-class offender model

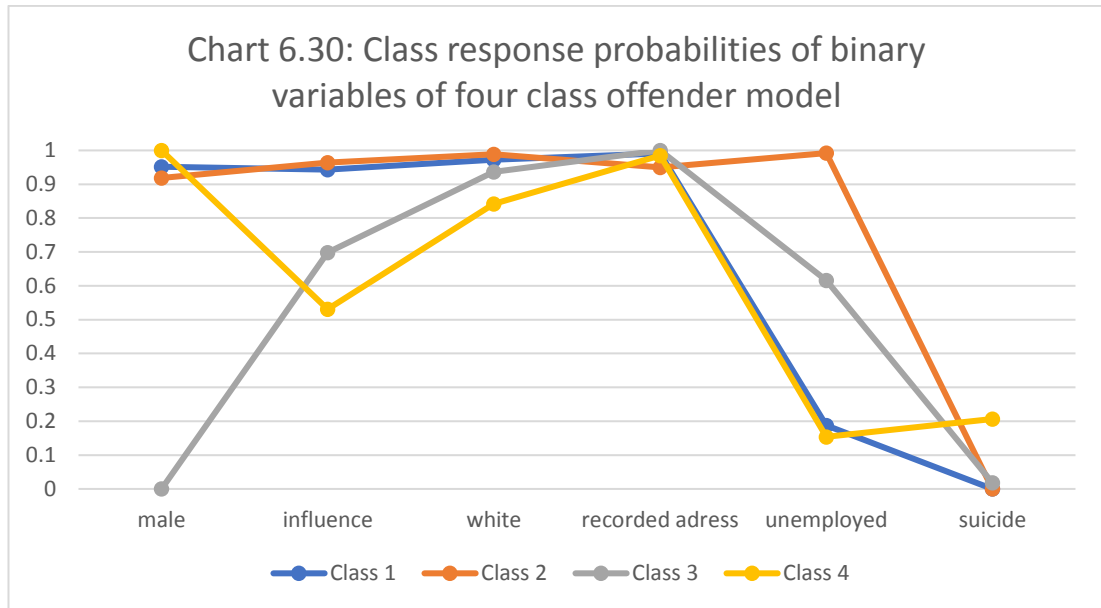


Note 1: Source: SHD. Base: n=3458.

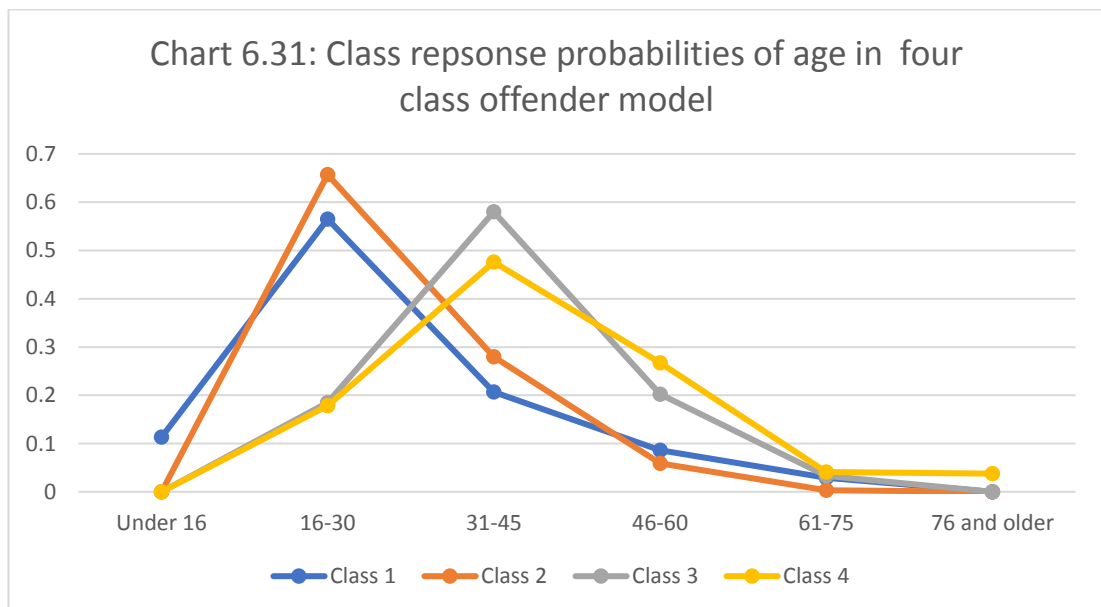


Note 1: Source: SHD. Base: n=3458.

Appendix 6.5: Four-class offender model

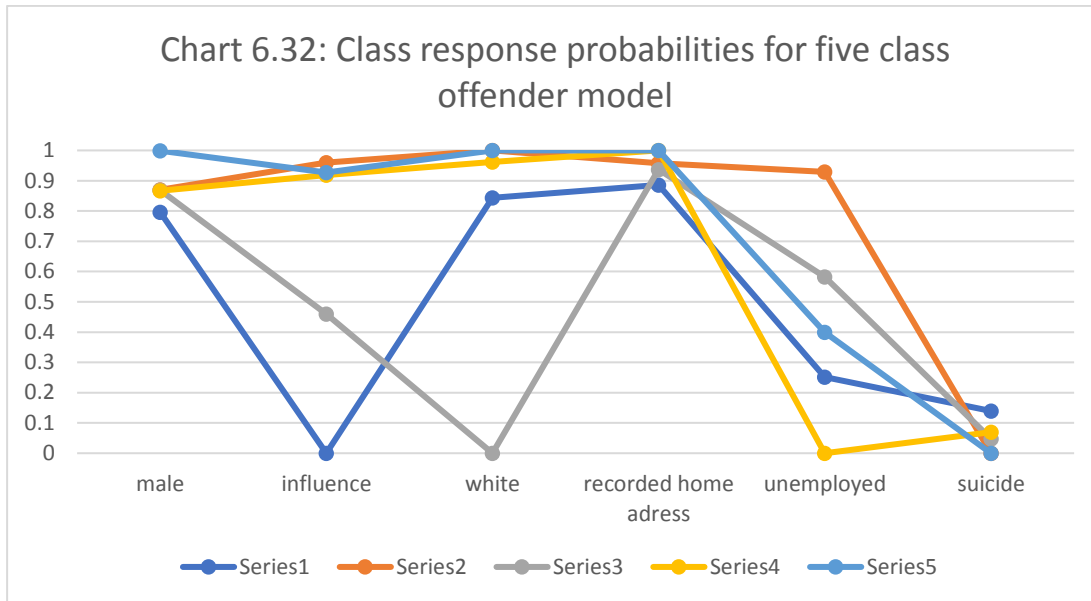


Note 1: Source: SHD. Base: n=3458.

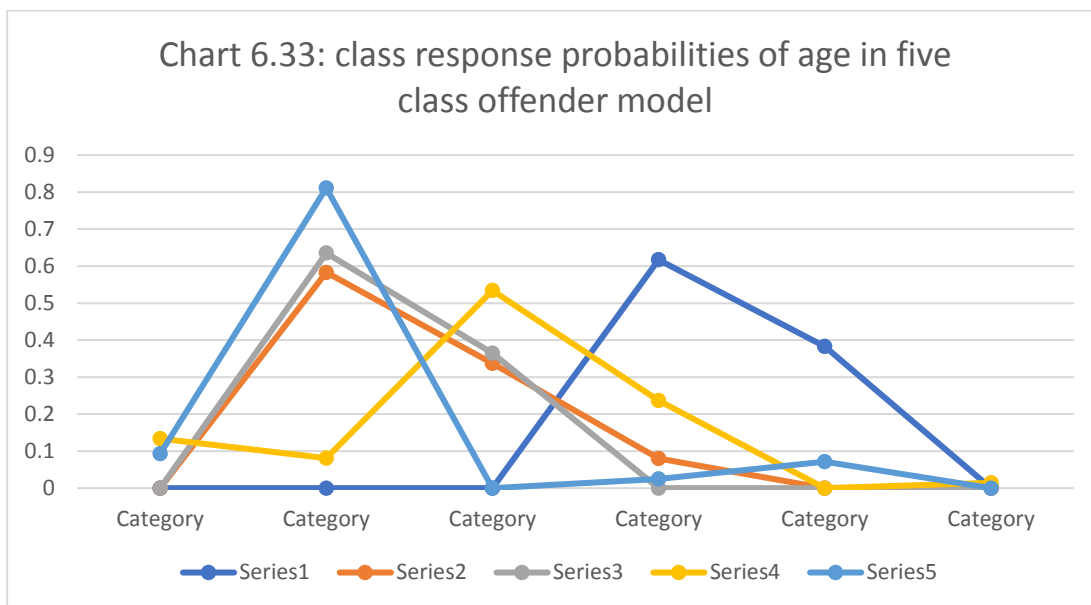


Note 1: Source: SHD. Base: n=3458.

Appendix 6.6: Four-class offender model (16-year dataset)

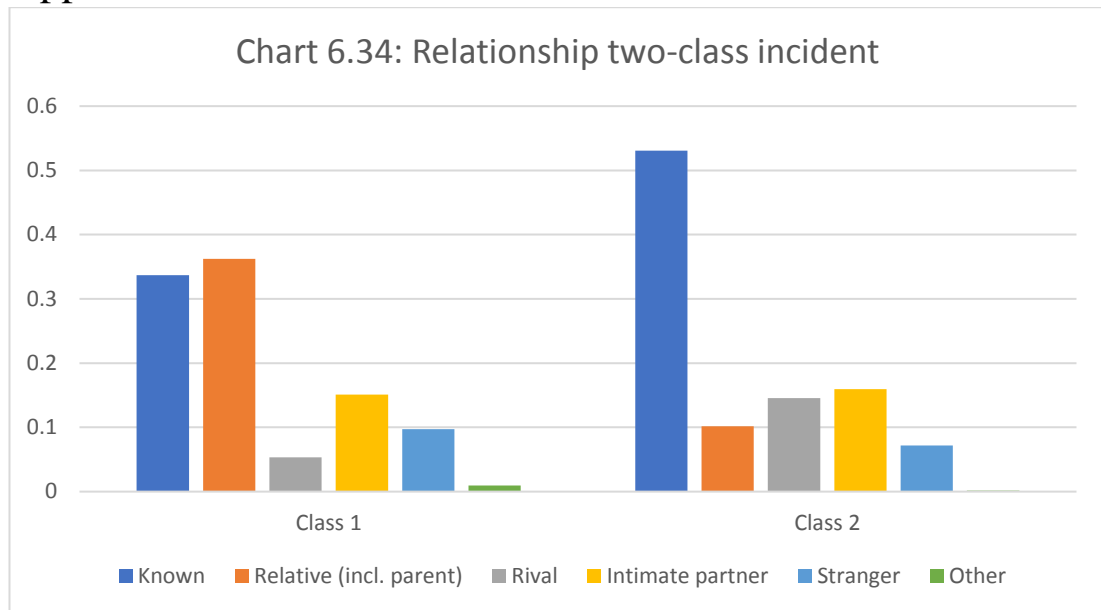


Note 1: Source: SHD. Base: n=1979.

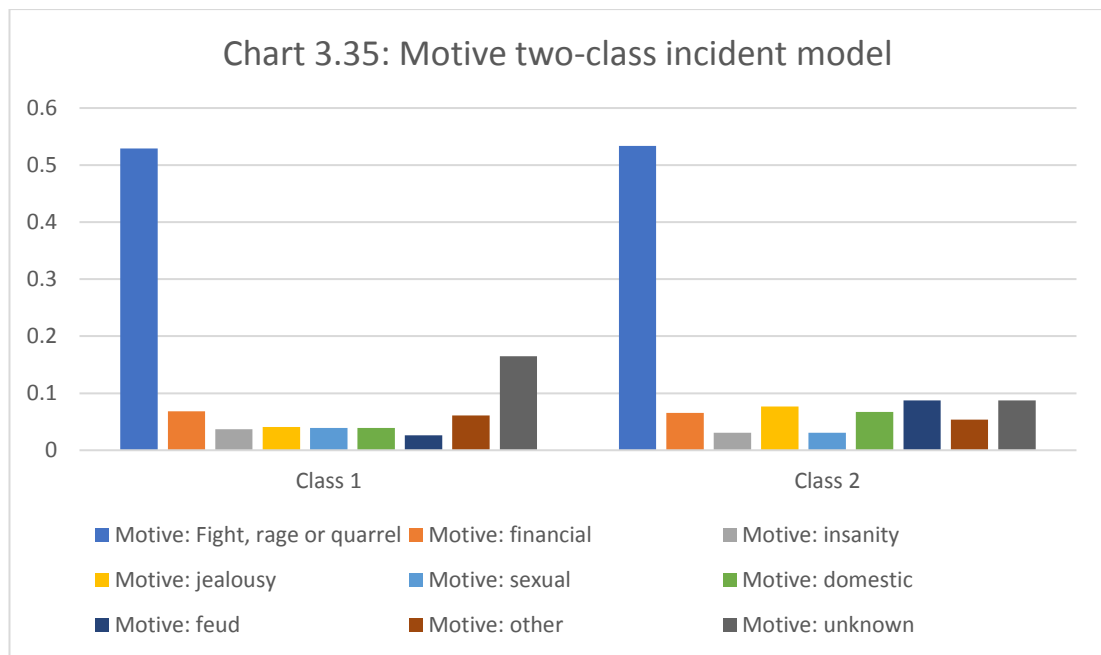


Note 1: Source: SHD. Base: n=1979.

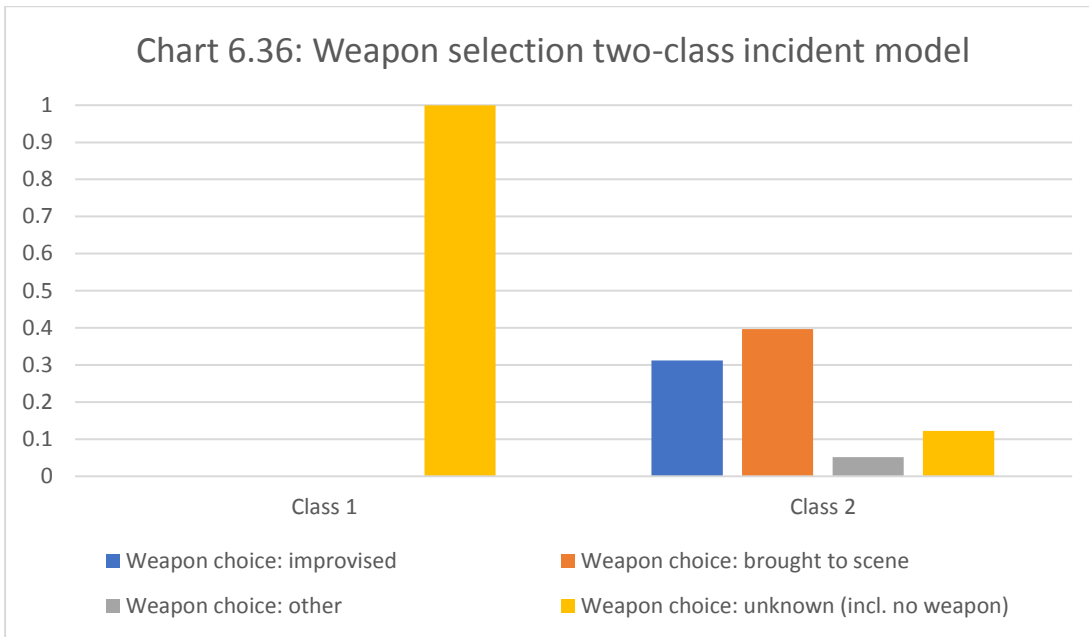
Appendix 6.7: Two-class incident model



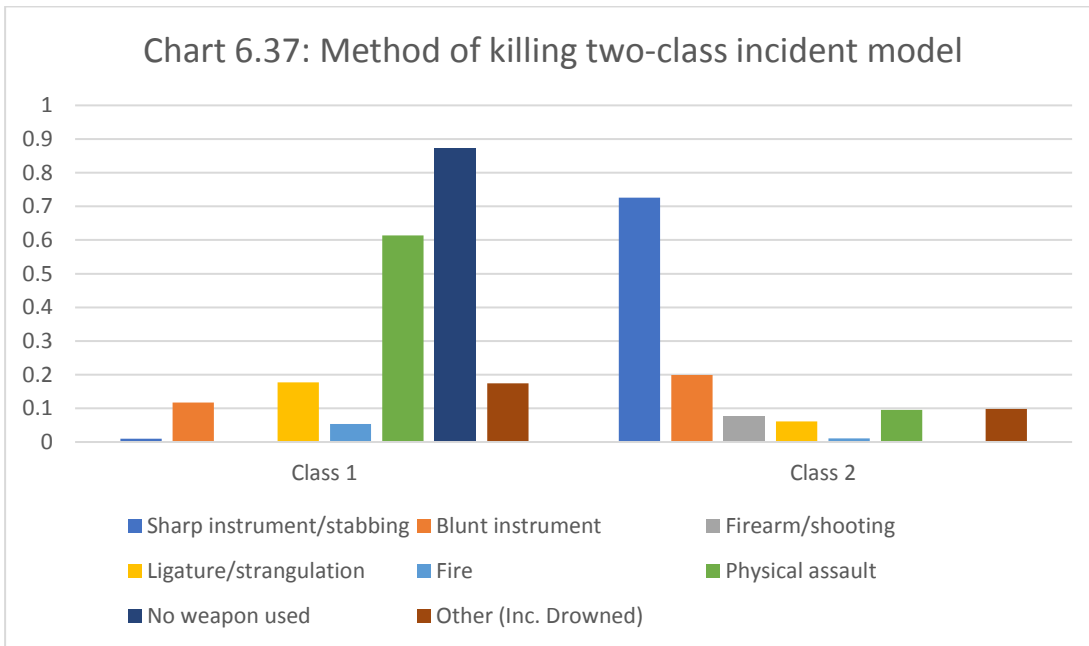
Note 1: Source: SHD. Base: n=2400.



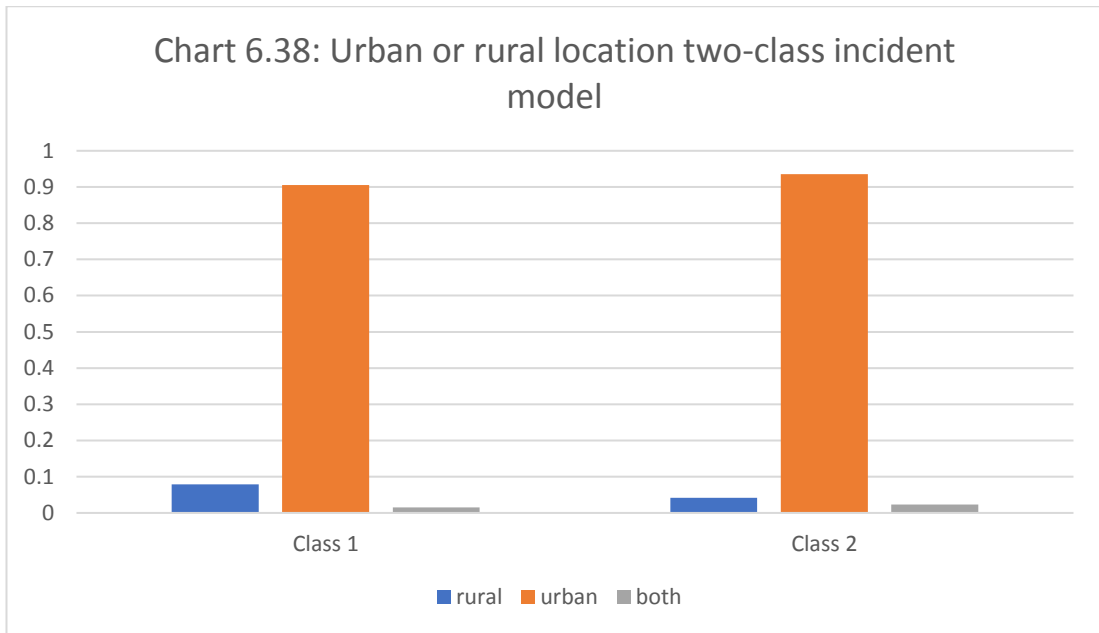
Note 1: Source: SHD. Base: n=2400.



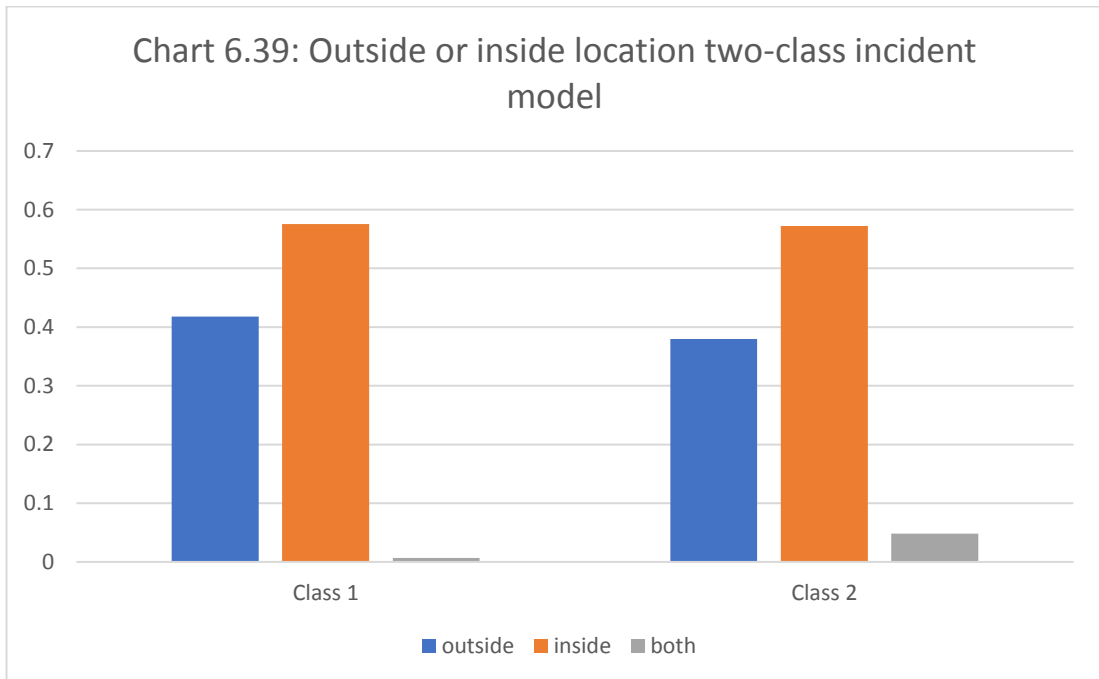
Note 1: Source: SHD. Base: n=2400.



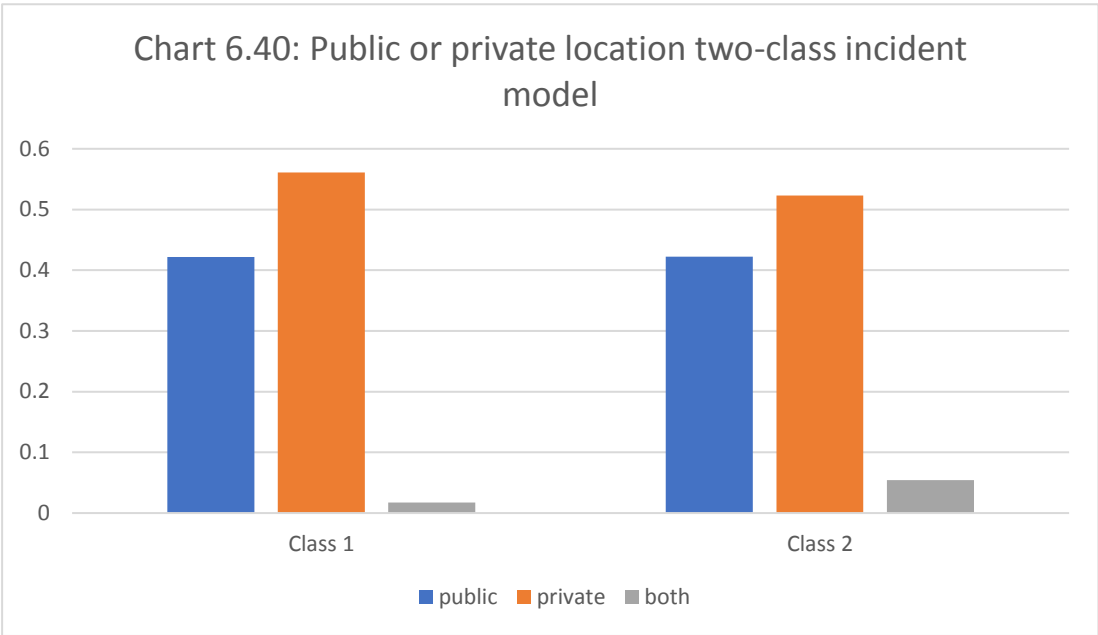
Note 1: Source: SHD. Base: n=2400.



Note 1: Source: SHD. Base: n=2400.

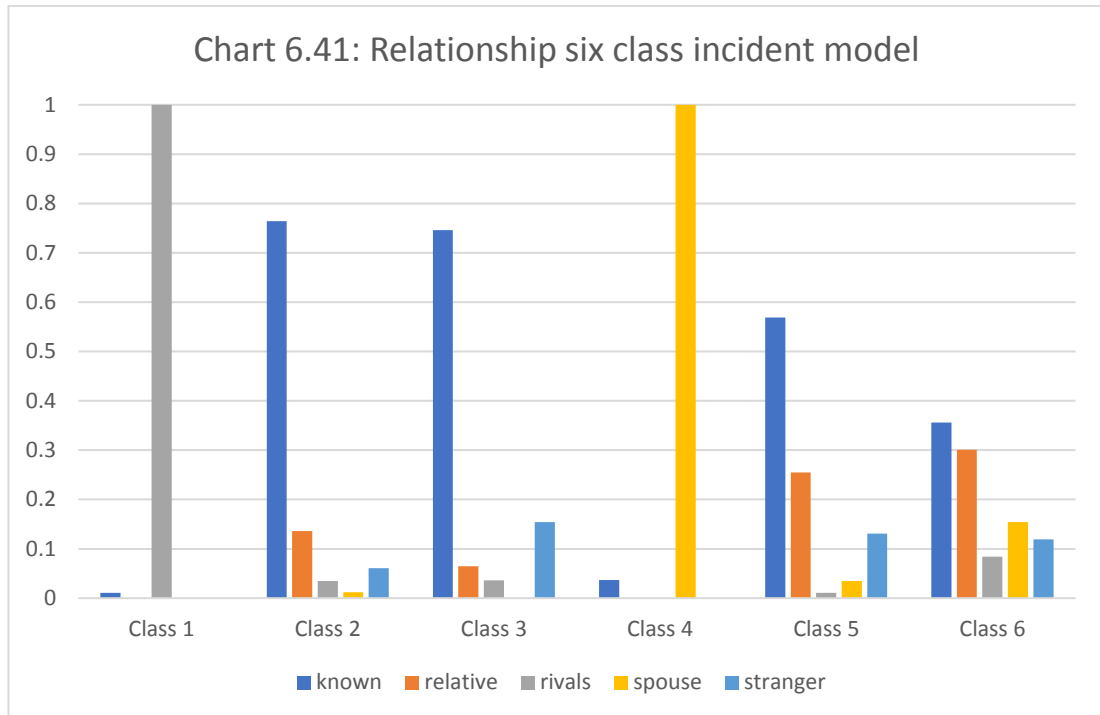


Note 1: Source: SHD. Base: n=2400.

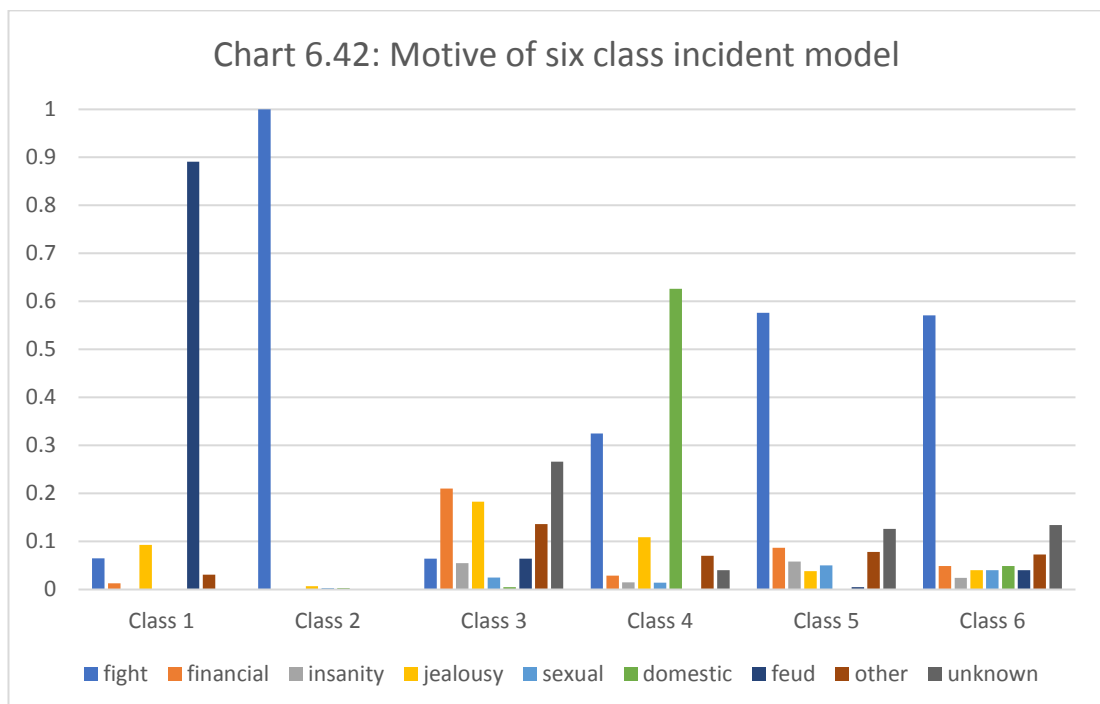


Note 1: Source: SHD. Base: n=2400.

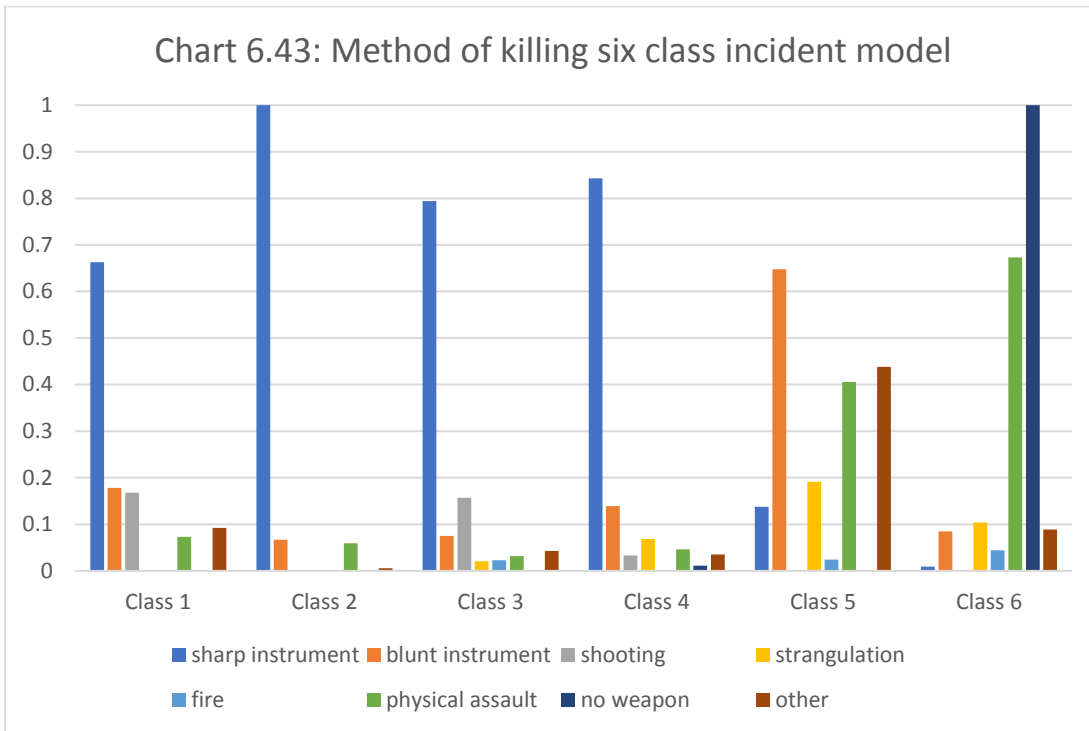
Appendix 6.8: Six-class incident model (16-year dataset)



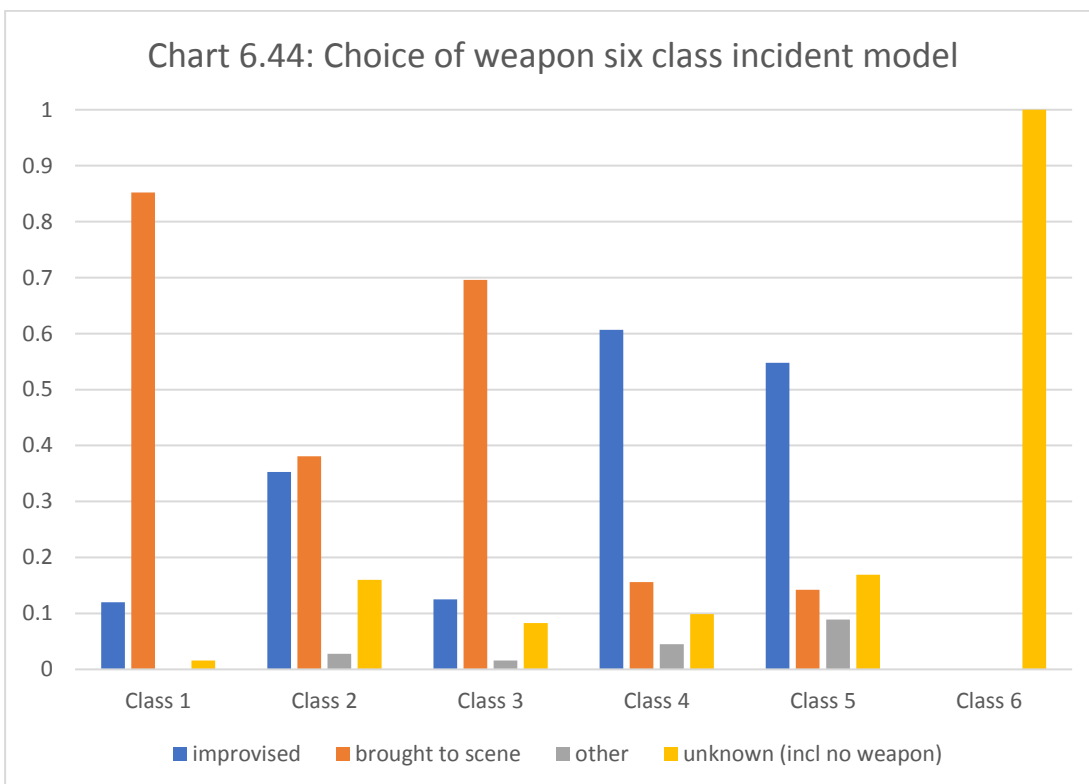
Note 1: Source: SHD. Base: n=1344.



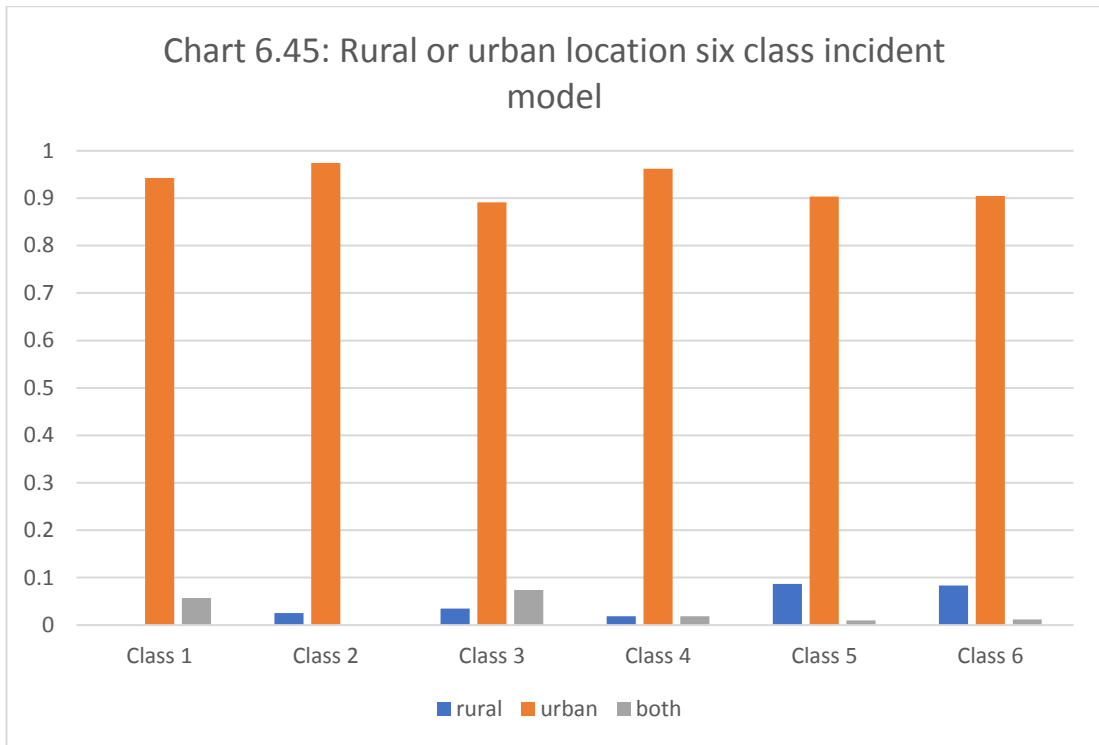
Note 1: Source: SHD. Base: n=1344.



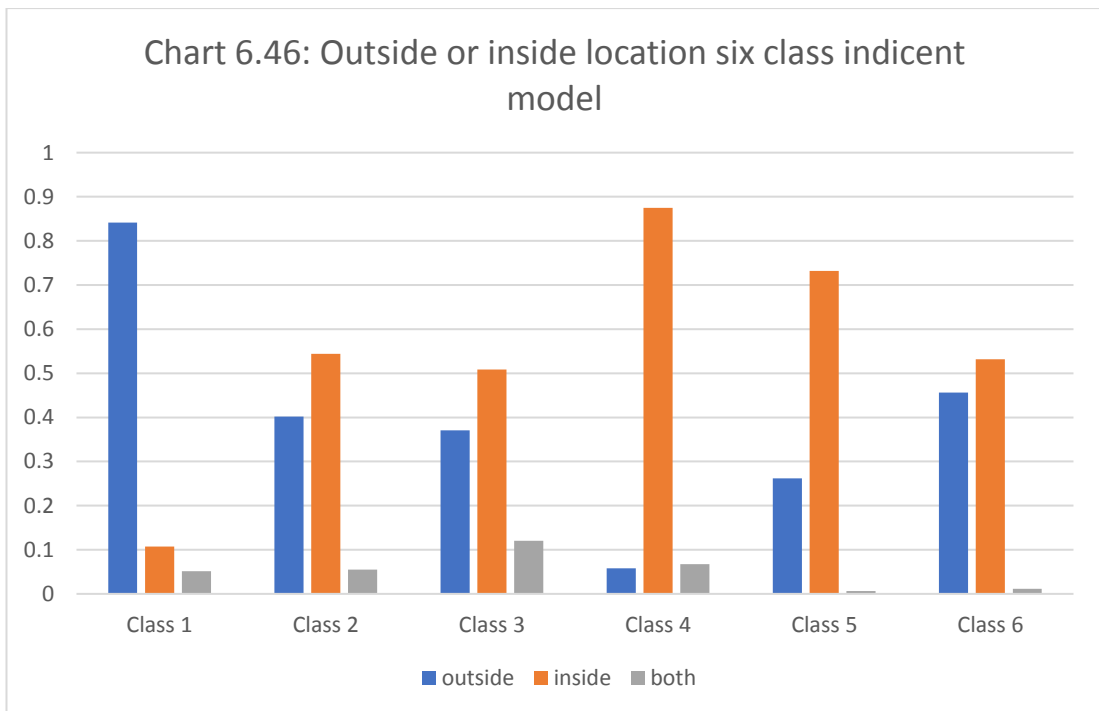
Note 1: Source: SHD. Base: n=1344.



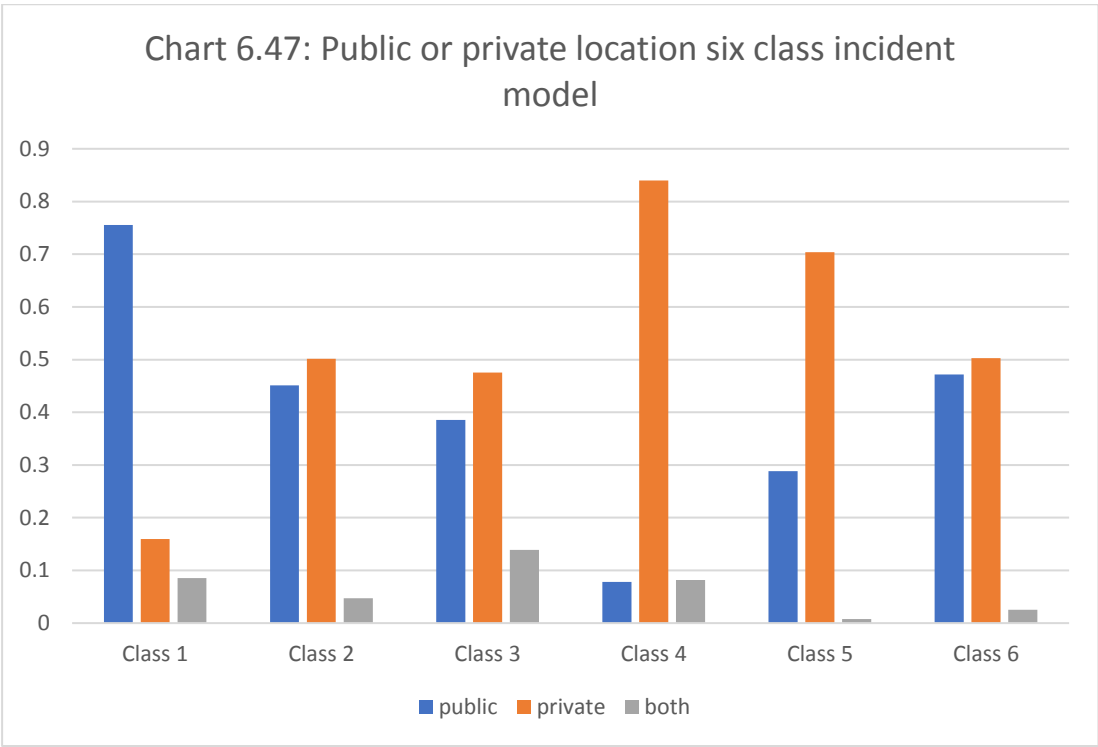
Note 1: Source: SHD. Base: n=1344.



Note 1: Source: SHD. Base: n=1344.



Note 1: Source: SHD. Base: n=1344.



Note 1: Source: SHD. Base: n=1344.

Appendix 7.1: Mplus syntax for two-level homicide model

```
Missing are all (-9999) ;
USEVARIABLES = crimeid offmale offage
offsuicide
offwhite offhome offunemp
weps_imp weps_pre weps_oth2 weps_unk
rel_known rel_rel2 rel_rival rel_spouse rel_strange
mot_fight mot_fin mot_insane mot_jeal mot_sex
mot_oth3 mot_unk mot_dom mot_feud mok_sharp mok_blunt
mok_shoot mok_fire mok_none mok_strangle mok_oth2
mok_ass
vicmale vicfemale vicage1 vicage2 vicage3 vicage4
vicage5 vicage6 vicdrgalc vicsober
vicemp vicunemp vichome vichomeless
vicwhite vicnowwhite
outinside pubprivate
xx2 xx3 xx4 vic_num2 ;
CATEGORICAL = offmale offage
offsuicide
offwhite offhome offunemp
weps_imp weps_pre weps_oth2 weps_unk
rel_known rel_rel2 rel_rival rel_spouse rel_strange
mot_fight mot_fin mot_insane mot_jeal mot_sex
mot_oth3 mot_unk mot_dom mot_feud mok_sharp mok_blunt
mok_shoot mok_fire mok_none mok_strangle mok_oth2
mok_ass
vicmale vicfemale vicage1 vicage2 vicage3 vicage4
vicage5 vicage6 vicdrgalc vicsober
vicemp vicunemp vichome vichomeless
vicwhite vicnowwhite vic_num2;
NOMINAL = outinside pubprivate ;
CLASSES = cb (4) cw (3) ;
WITHIN = offmale offage
offsuicide
offwhite offhome offunemp ;
BETWEEN = weps_imp weps_pre weps_oth2 weps_unk
rel_known rel_rel2 rel_rival rel_spouse rel_strange
mot_fight mot_fin mot_insane mot_jeal mot_sex
mot_oth3 mot_unk mot_dom mot_feud mok_sharp mok_blunt
mok_shoot mok_fire mok_none mok_strangle mok_oth2
mok_ass
vicmale vicfemale vicage1 vicage2 vicage3 vicage4
vicage5 vicage6 vicdrgalc vicsober
vicemp vicunemp vichome vichomeless
vicwhite vicnowwhite
outinside pubprivate xx2 xx3 xx4 vic_num2 cb ;
```

```

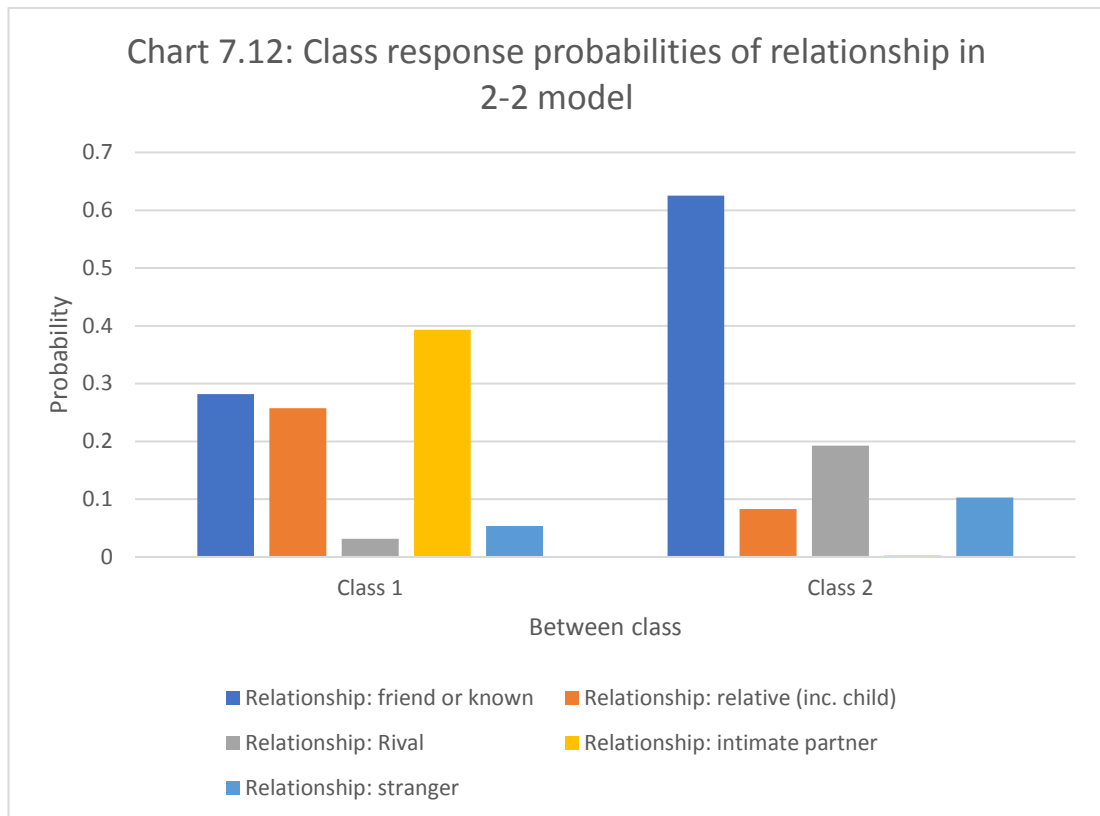
CLUSTER = crimeid ;
Analysis:
Type = TWOLEVEL MIXTURE ;
starts = 1000 600;
MITERATIONS = 1000;
Model:
%WITHIN%
%OVERALL%
%BETWEEN%
%OVERALL%
cw#1 cw#2 ON cb ;
cb on xx2 xx3 xx4 ;
MODEL CW:
%Within%
%cw#1%
[offmale$1 offage$1
offsuicide$1
offwhite$1 offhome$1 offunemp$1] ;
[offage$2] ;
[offage$3] ;
[offage$4] ;
[offage$5] ;
%cw#2%
[offmale$1 offage$1
offsuicide$1
offwhite$1 offhome$1 offunemp$1] ;
[offage$2] ;
[offage$3] ;
[offage$4] ;
[offage$5] ;
%cw#3%
[offmale$1 offage$1
offsuicide$1
offwhite$1 offhome$1 offunemp$1] ;
[offage$2] ;
[offage$3] ;
[offage$4] ;
[offage$5] ;
MODEL CB:
%Between%
%cb#1%
[weps_imp$1 weps_pre$1 weps_oth2$1 weps_unk$1
rel_known$1 rel_rel2$1 rel_rival$1 rel_spouse$1 rel_strange$1
mot_fight$1 mot_fin$1 mot_insane$1 mot_jeal$1 mot_sex$1
mot_oth3$1 mot_unk$1 mot_dom$1 mot_feud$1 mok_sharp$1 mok_blunt$1
mok_shoot$1 mok_fire$1 mok_none$1 mok_strangle$1 mok_oth2$1

```

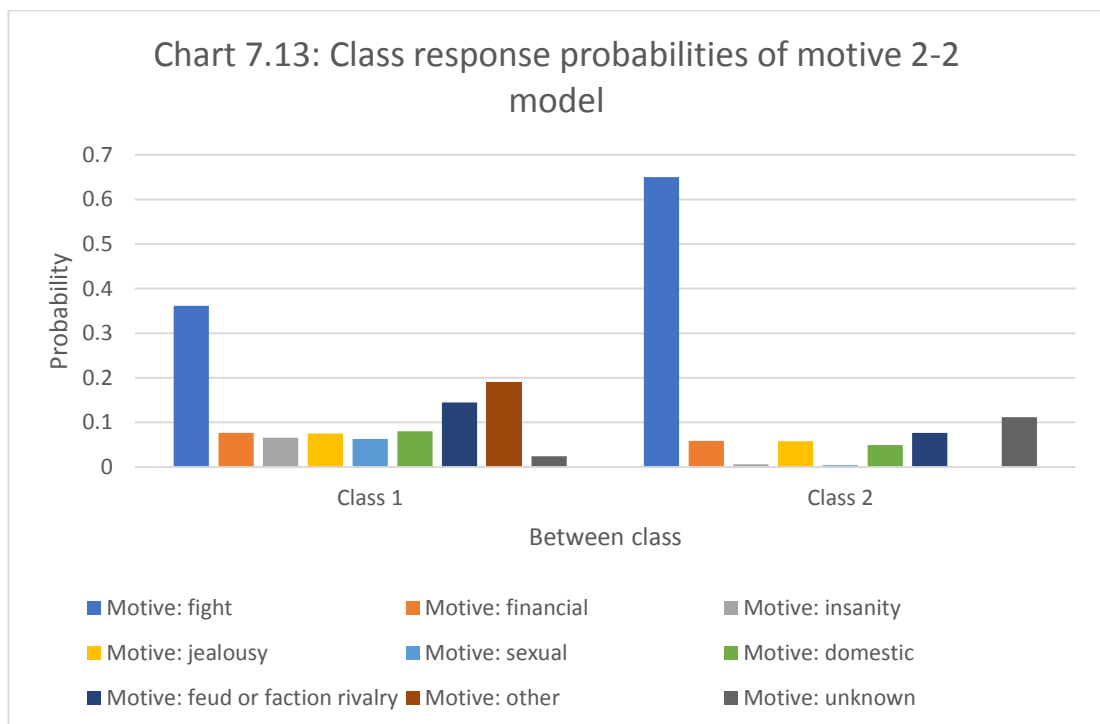
mok_ass\$1
vicmale\$1 vicfemale\$1 vicage1\$1 vicage2\$1 vicage3\$1 vicage4\$1
vicage5\$1 vicage6\$1 vicdrgalc\$1 vicsober\$1
vicemp\$1 vicunemp\$1 vichome\$1 vichomeless\$1
vicwhite\$1 vicnowwhite\$1 vic_num2\$1
outinside#1 pubprivate#1] ;
[outinside#2 pubprivate#2] ;
%cb#2%
[weps_imp\$1 weps_pre\$1 weps_oth2\$1 weps_unk\$1
rel_known\$1 rel_rel2\$1 rel_rival\$1 rel_spouse\$1 rel_strange\$1
mot_fight\$1 mot_fin\$1 mot_insane\$1 mot_jeal\$1 mot_sex\$1
mot_oth3\$1 mot_unk\$1 mot_dom\$1 mot_feud\$1 mok_sharp\$1 mok_blunt\$1
mok_shoot\$1 mok_fire\$1 mok_none\$1 mok_strangle\$1 mok_oth2\$1
mok_ass\$1
vicmale\$1 vicfemale\$1 vicage1\$1 vicage2\$1 vicage3\$1 vicage4\$1
vicage5\$1 vicage6\$1 vicdrgalc\$1 vicsober\$1
vicemp\$1 vicunemp\$1 vichome\$1 vichomeless\$1
vicwhite\$1 vicnowwhite\$1 vic_num2\$1
outinside#1 pubprivate#1] ;
[outinside#2 pubprivate#2] ;
%cb#3%
[weps_imp\$1 weps_pre\$1 weps_oth2\$1 weps_unk\$1
rel_known\$1 rel_rel2\$1 rel_rival\$1 rel_spouse\$1 rel_strange\$1
mot_fight\$1 mot_fin\$1 mot_insane\$1 mot_jeal\$1 mot_sex\$1
mot_oth3\$1 mot_unk\$1 mot_dom\$1 mot_feud\$1 mok_sharp\$1 mok_blunt\$1
mok_shoot\$1 mok_fire\$1 mok_none\$1 mok_strangle\$1 mok_oth2\$1
mok_ass\$1
vicmale\$1 vicfemale\$1 vicage1\$1 vicage2\$1 vicage3\$1 vicage4\$1
vicage5\$1 vicage6\$1 vicdrgalc\$1 vicsober\$1
vicemp\$1 vicunemp\$1 vichome\$1 vichomeless\$1
vicwhite\$1 vicnowwhite\$1 vic_num2\$1
outinside#1 pubprivate#1] ;
[outinside#2 pubprivate#2] ;
%cb#4%
[weps_imp\$1 weps_pre\$1 weps_oth2\$1 weps_unk\$1
rel_known\$1 rel_rel2\$1 rel_rival\$1 rel_spouse\$1 rel_strange\$1
mot_fight\$1 mot_fin\$1 mot_insane\$1 mot_jeal\$1 mot_sex\$1
mot_oth3\$1 mot_unk\$1 mot_dom\$1 mot_feud\$1 mok_sharp\$1 mok_blunt\$1
mok_shoot\$1 mok_fire\$1 mok_none\$1 mok_strangle\$1 mok_oth2\$1
mok_ass\$1
vicmale\$1 vicfemale\$1 vicage1\$1 vicage2\$1 vicage3\$1 vicage4\$1
vicage5\$1 vicage6\$1 vicdrgalc\$1 vicsober\$1
vicemp\$1 vicunemp\$1 vichome\$1 vichomeless\$1
vicwhite\$1 vicnowwhite\$1 vic_num2\$1
outinside#1 pubprivate#1] ;
[outinside#2 pubprivate#2] ;

OUTPUT: CINTERVAL RESIDUAL;
SAVEDATA:
FILE IS MasterLCA4d34.cla ;
SAVE = CPROBABILITIES ;

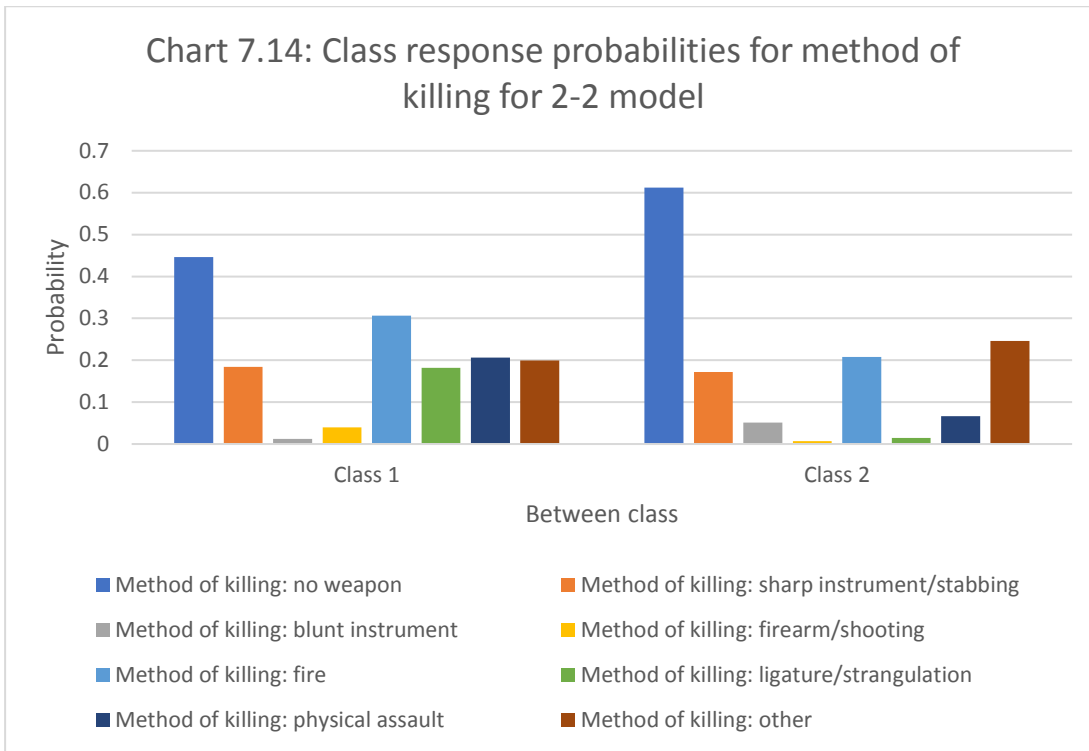
Appendix 7.2: 2-2 homicide model



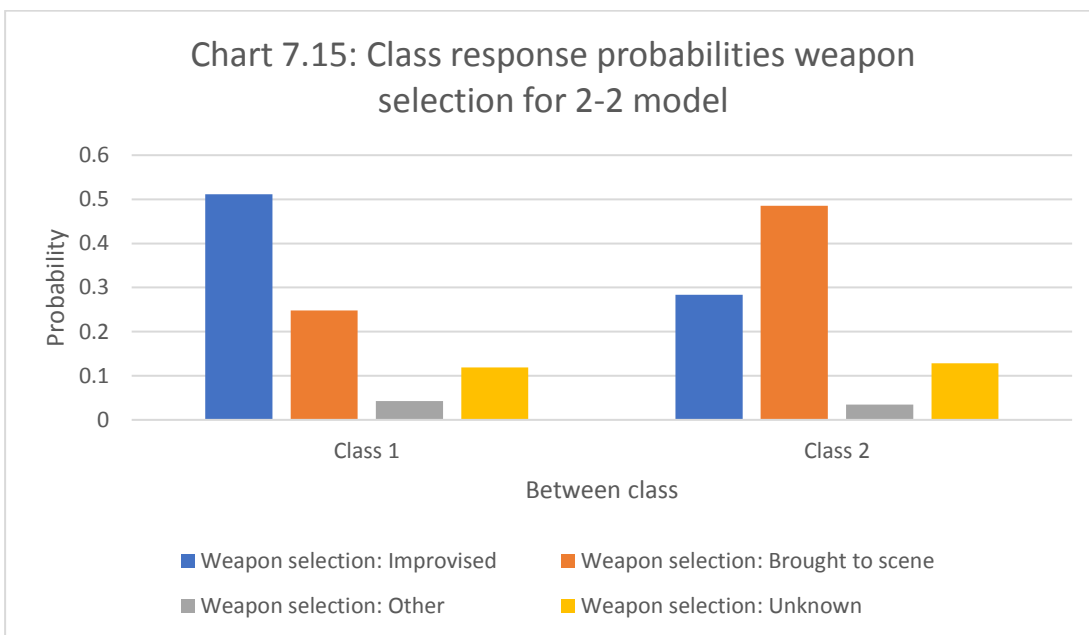
Note 1: Source: SHD. Base: n=1978



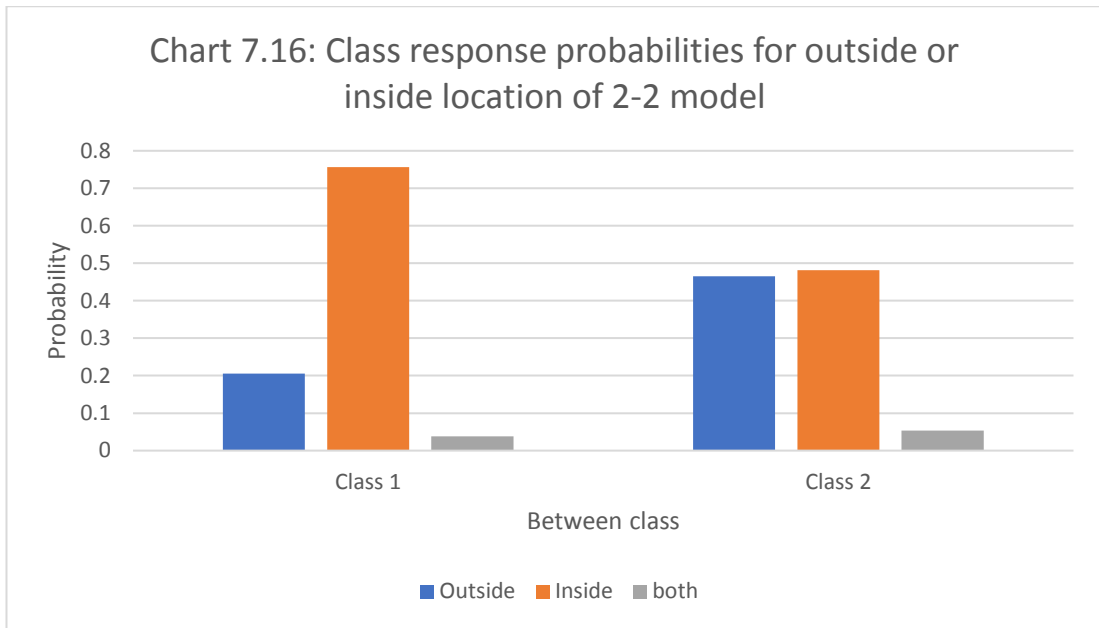
Note 1: Source: SHD. Base: n=1978



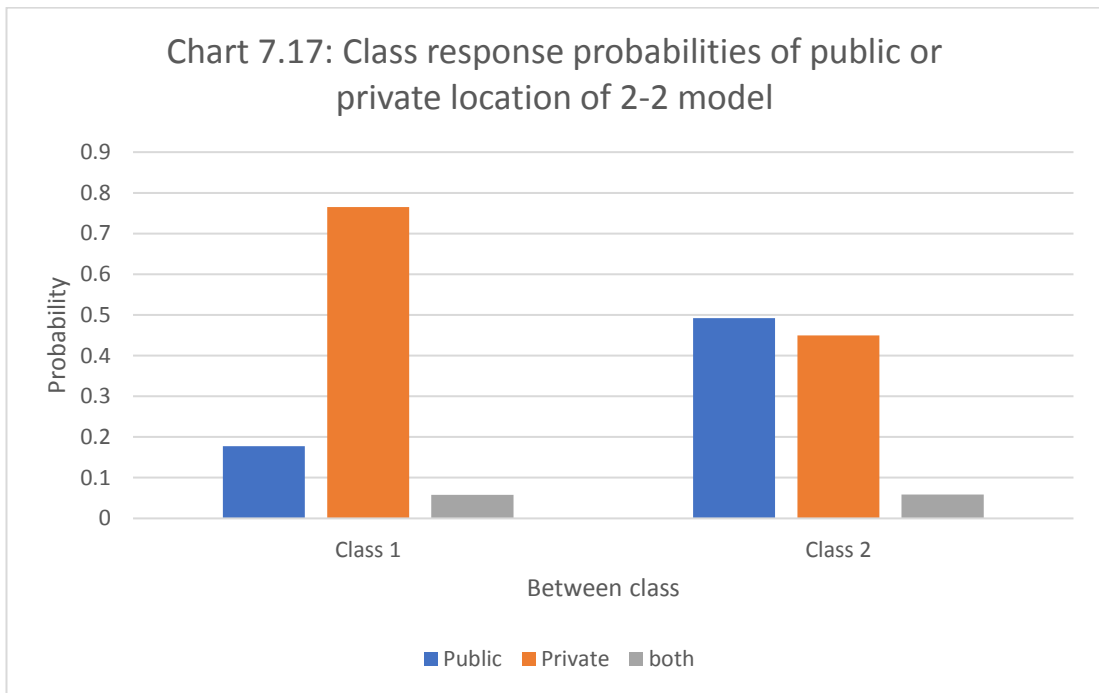
Note 1: Source: SHD. Base: n=1978



Note 1: Source: SHD. Base: n=1978

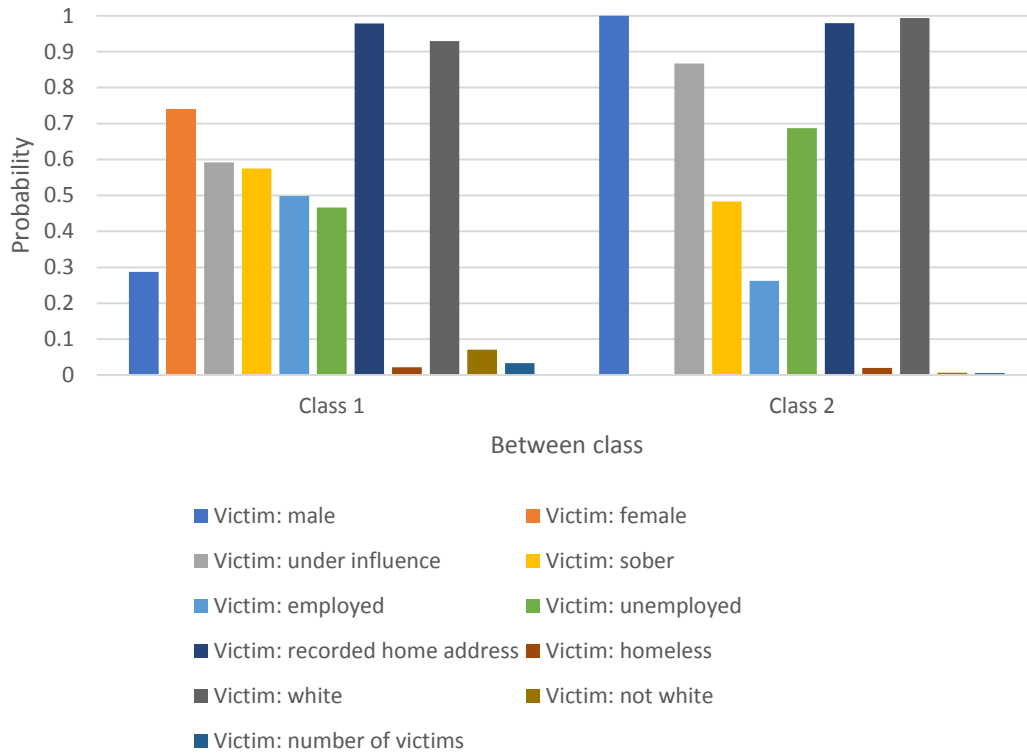


Note 1: Source: SHD. Base: n=1978



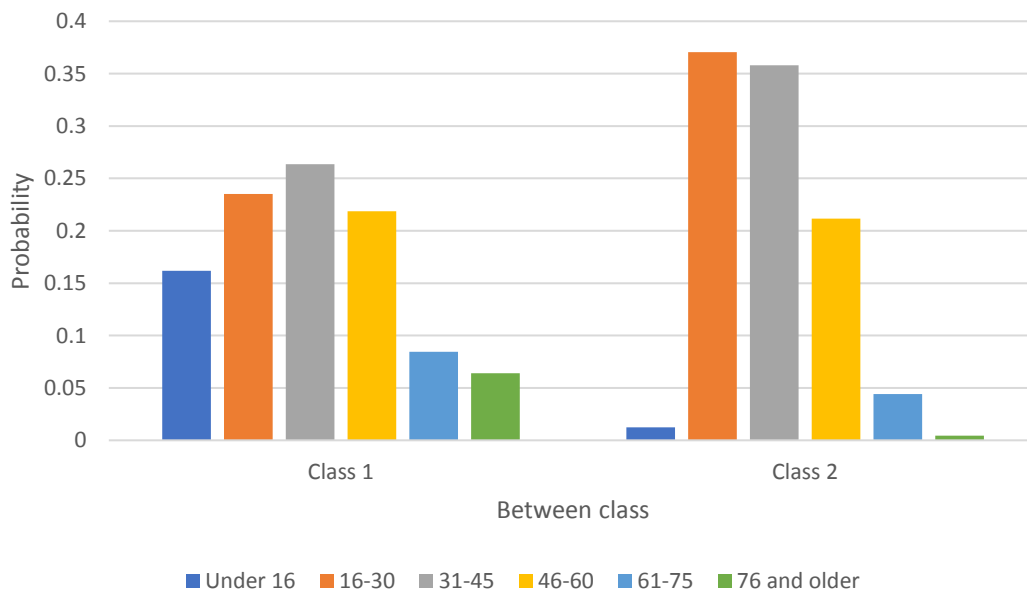
Note 1: Source: SHD. Base: n=1978

Chart 7.18: Class response probabilities for binary victim variables for 2-2 model

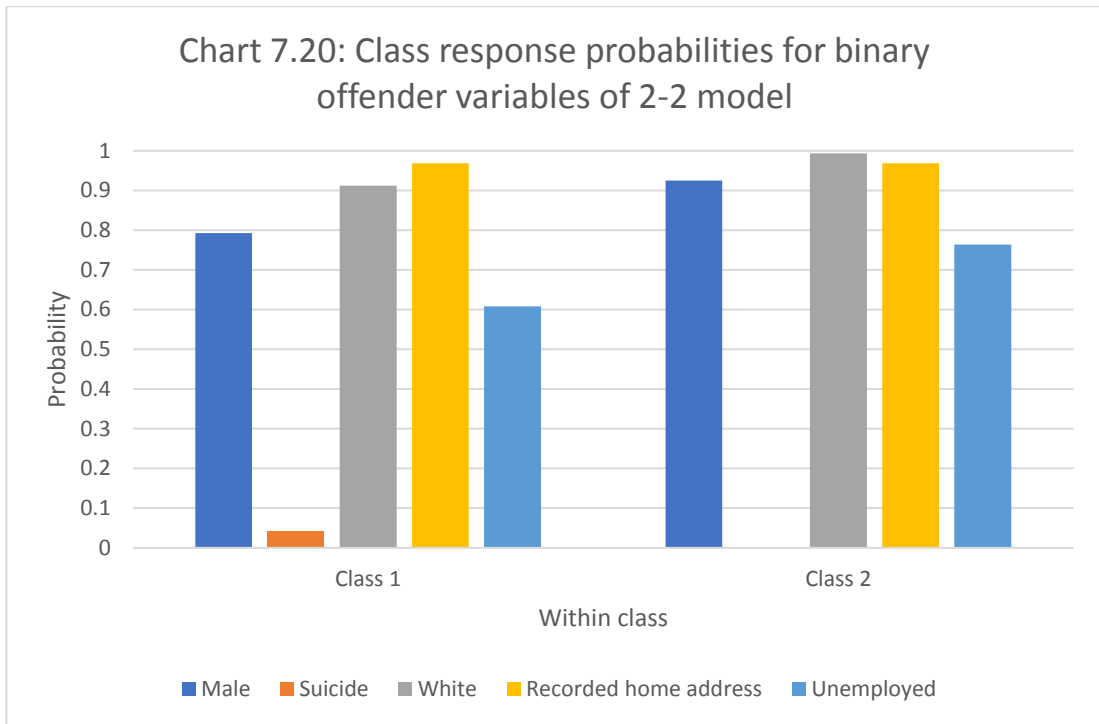


Note 1: Source: SHD. Base: n=1978

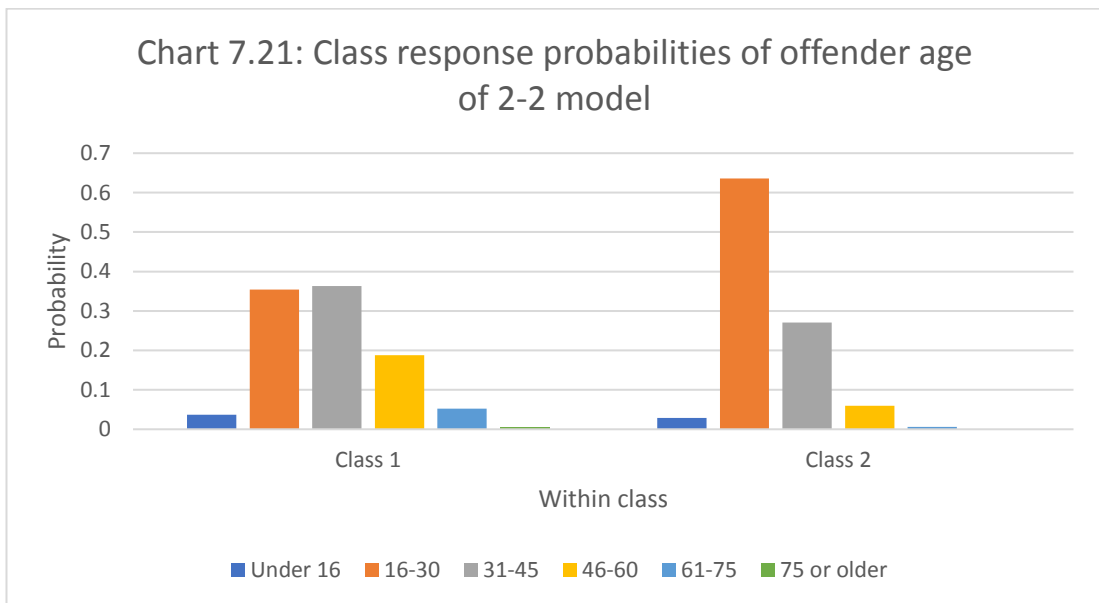
Chart 7.19: Class response probabilities for victim age of 2-2 model



Note 1: Source: SHD. Base: n=1978

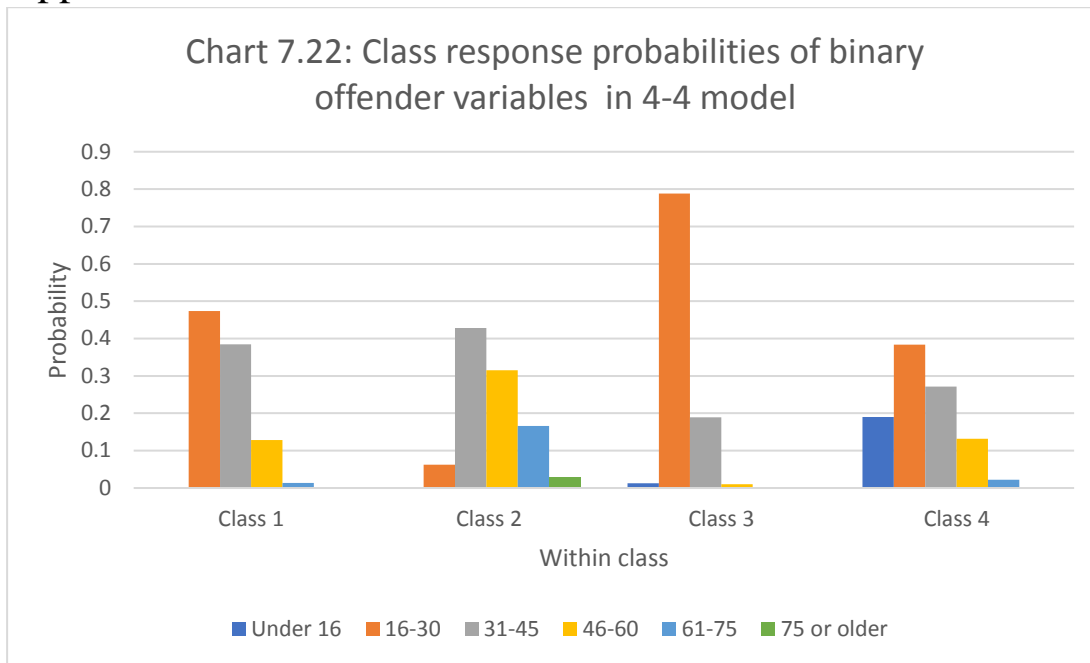


Note 1: Source: SHD. Base: n=1978

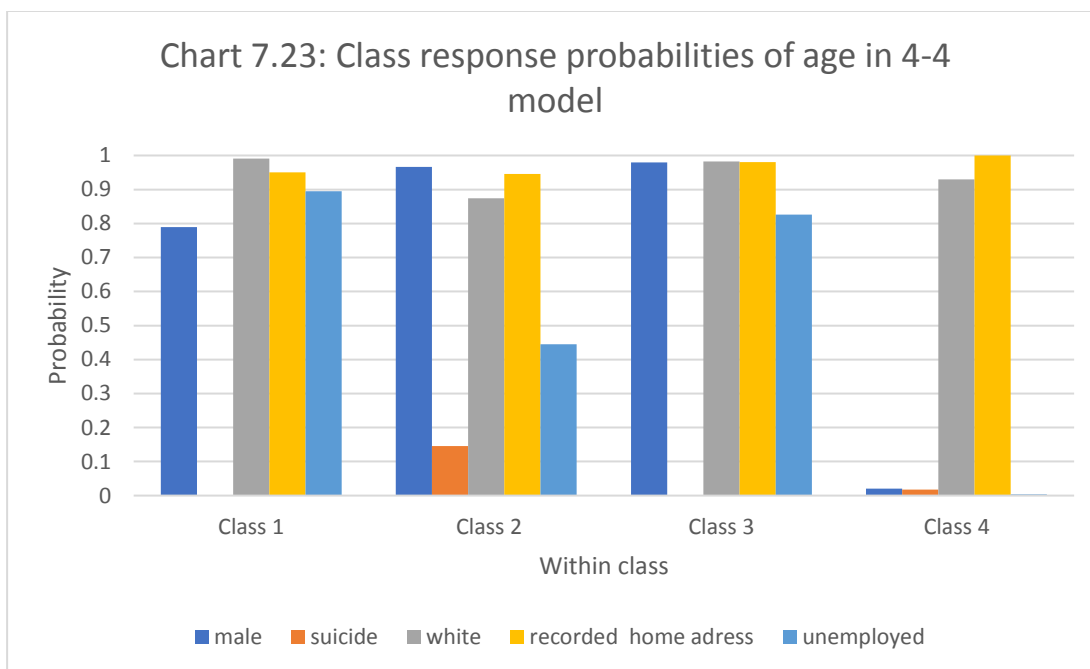


Note 1: Source: SHD. Base: n=1978

Appendix 7.3: 4-4 homicide model, within classes

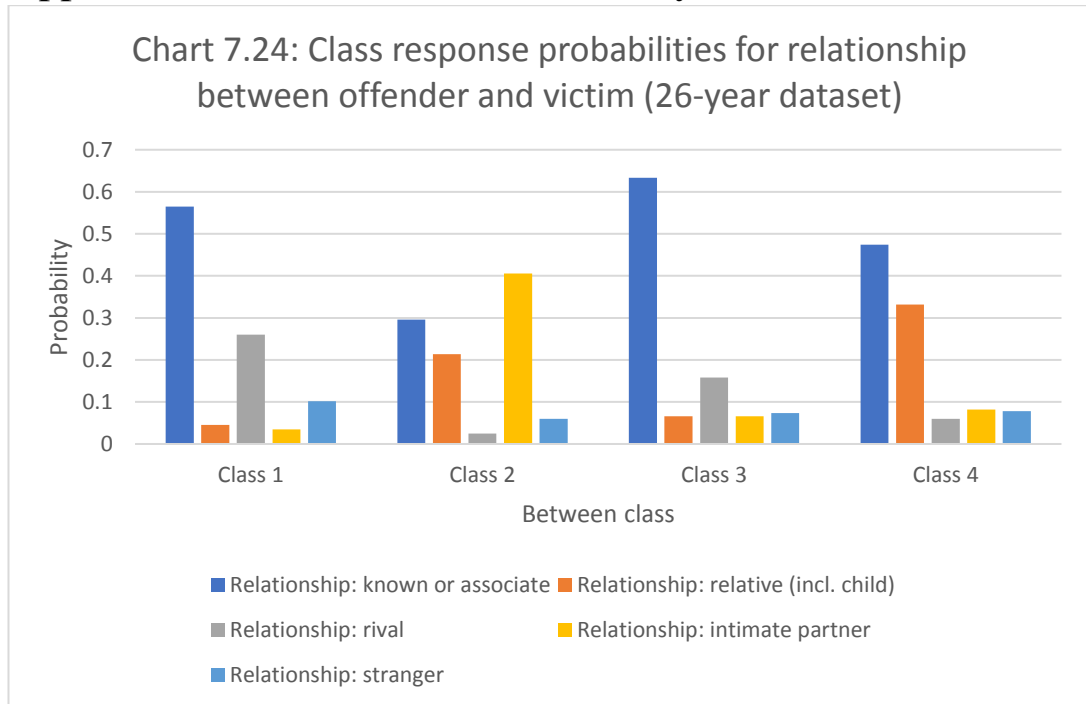


Note 1: Source: SHD. Base: n=1978

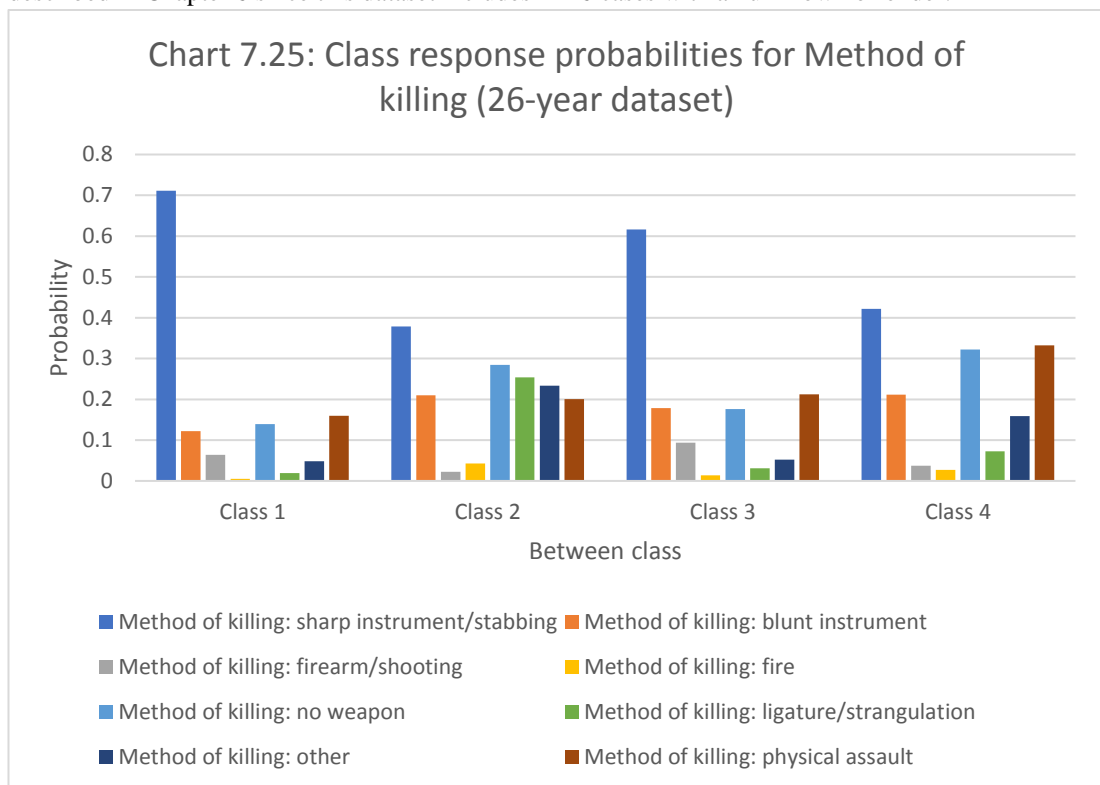


Note 1: Source: SHD. Base: n=1978

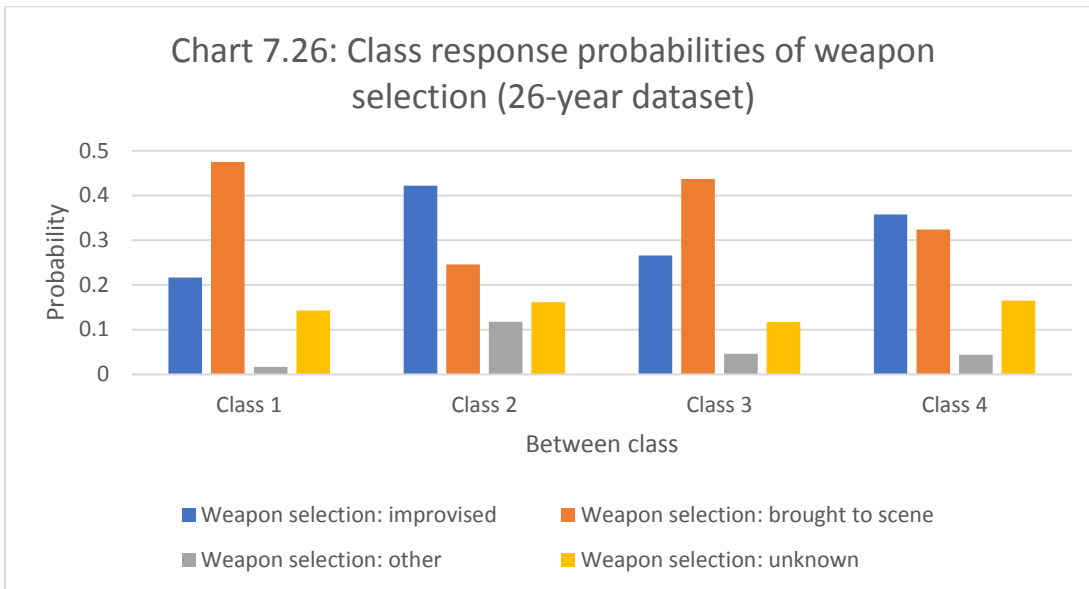
Appendix 7.4: 4-3 homicide model 26-year dataset



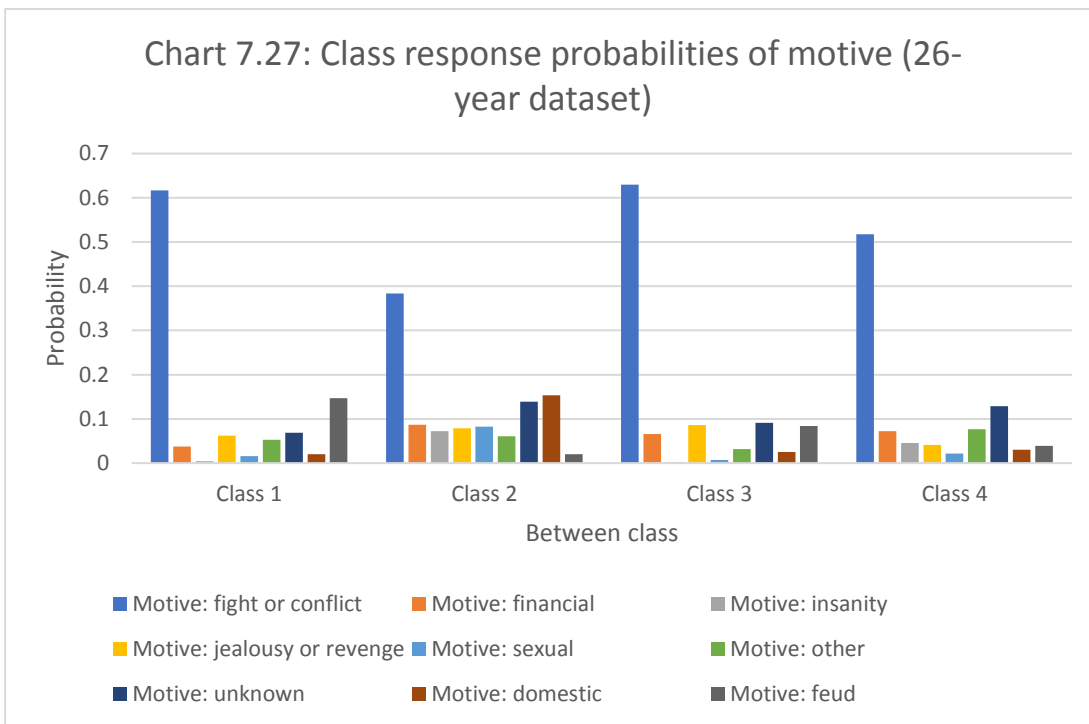
Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.



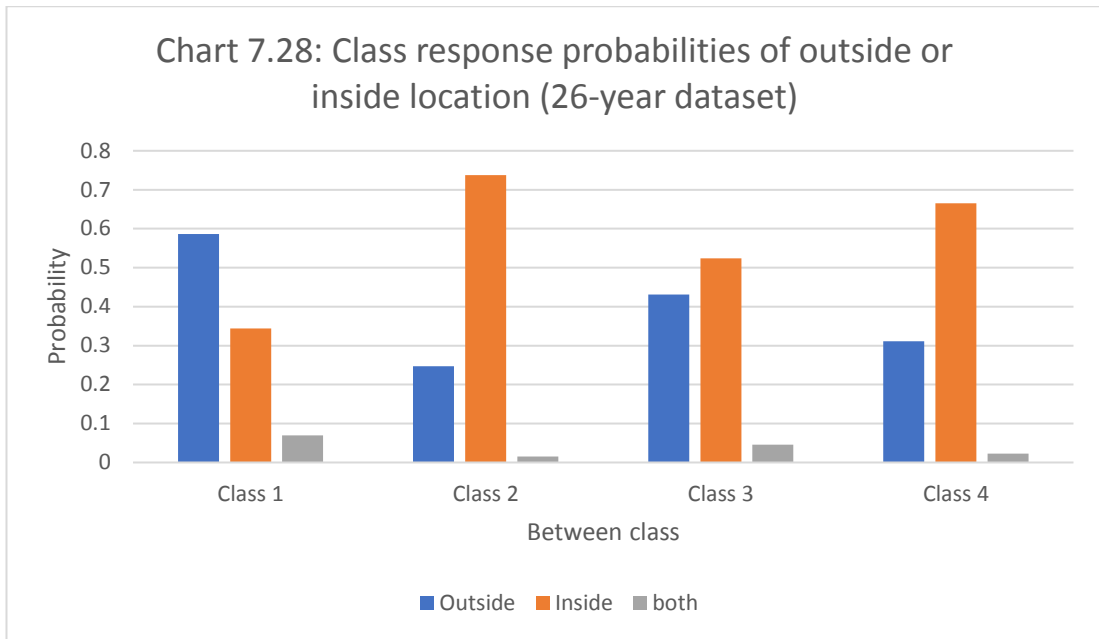
Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.



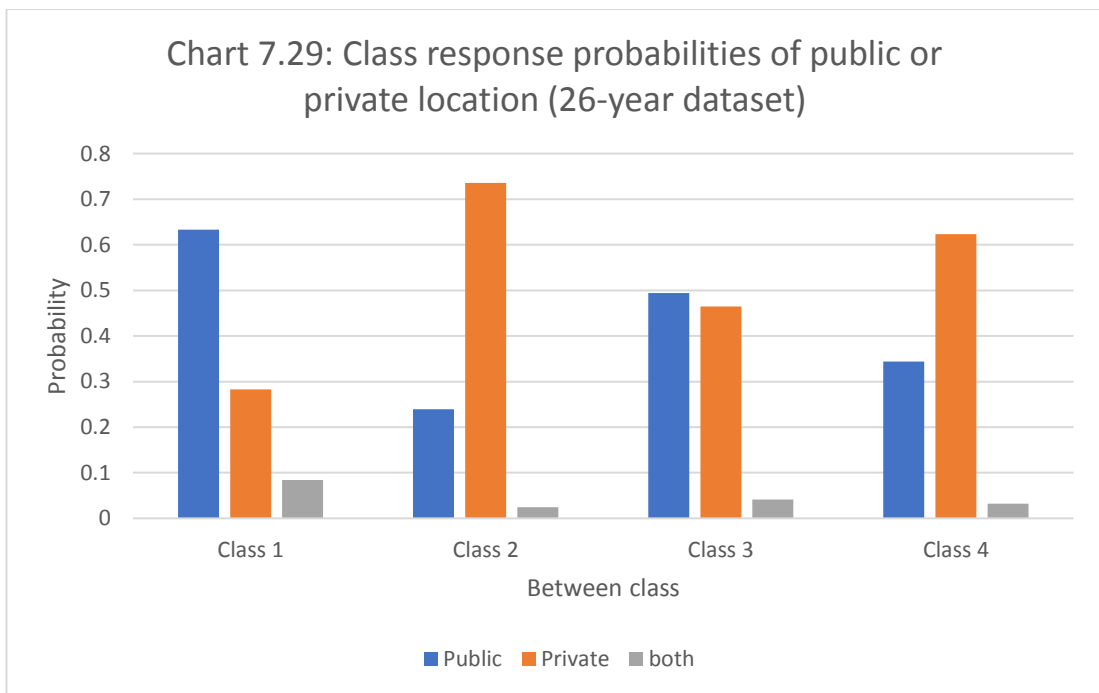
Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.



Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.

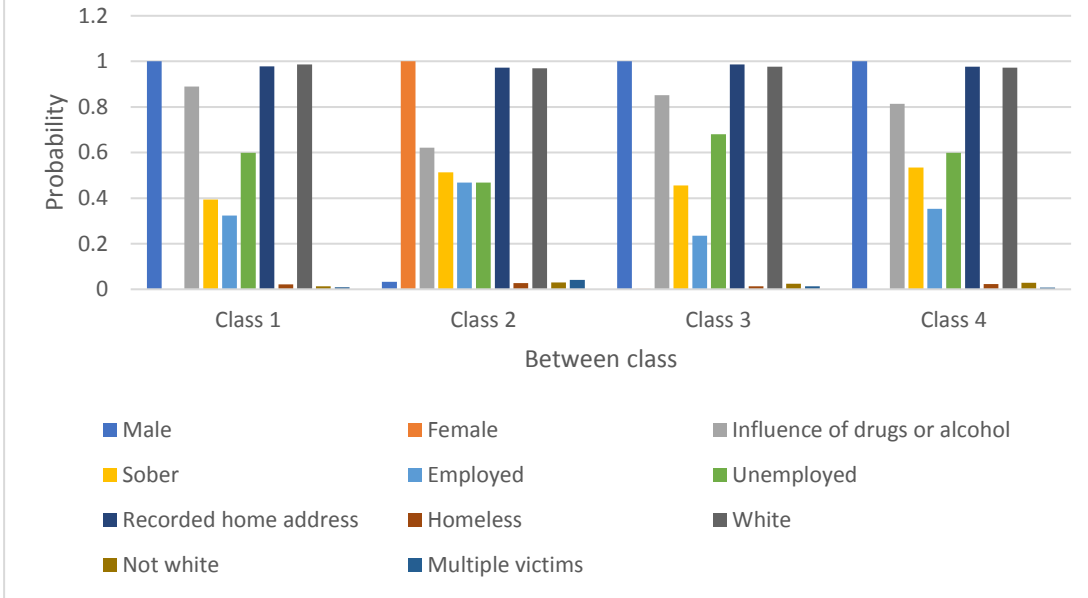


Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.



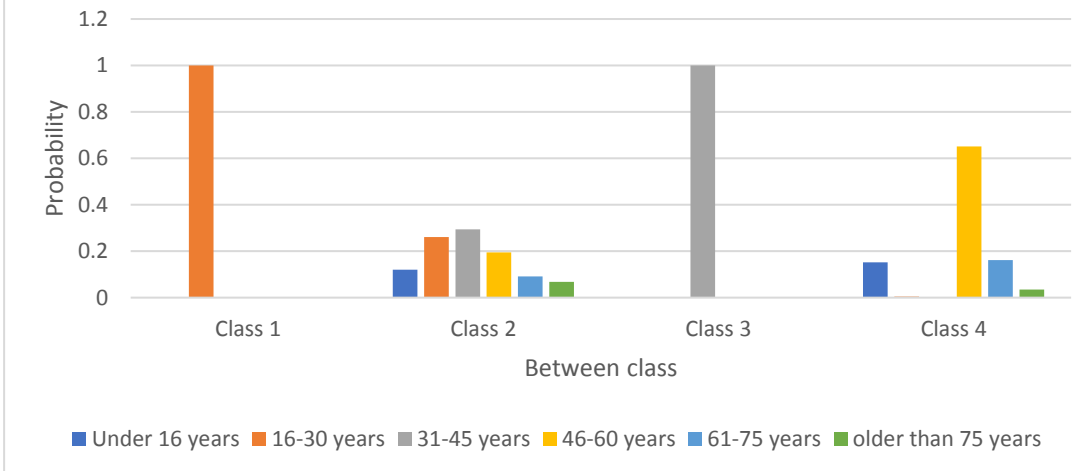
Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.

Chart 7.30: Class response probabilities of binary victim variables (26-year dataset)

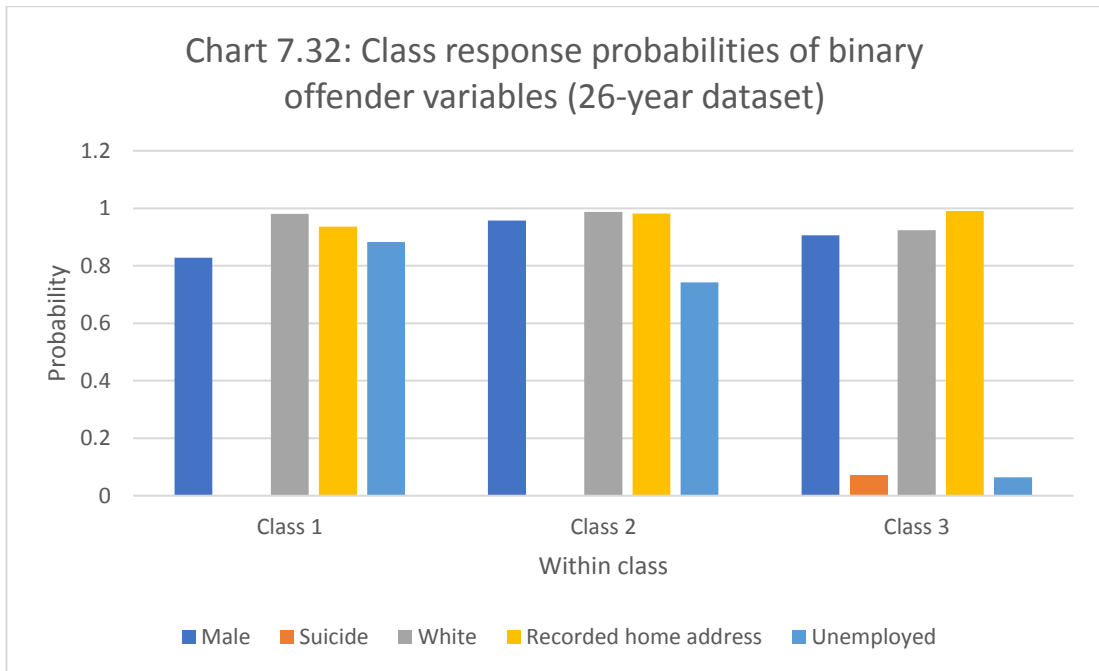


Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.

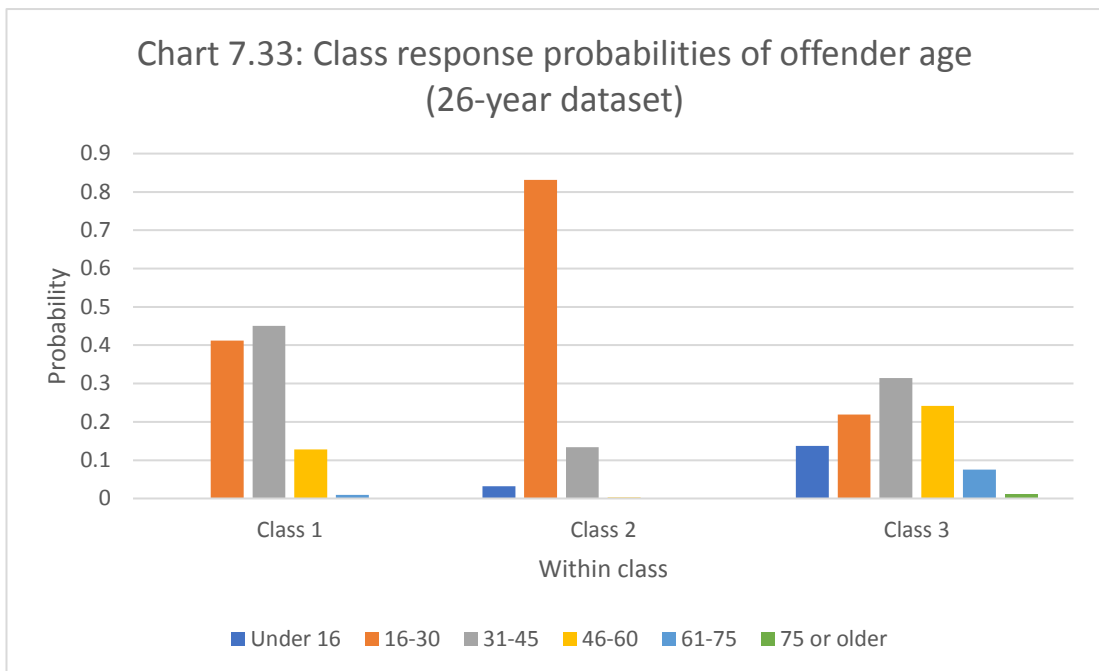
Chart 7.31: Class response probabilities of victim age (26-year dataset)



Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.



Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.



Note 1: Source: SHD. Base: n=3484. This base is different from the 1990-2015 offender dataset described in Chapter 6 since this dataset includes n=26 cases with an unknown offender.

Appendix 8.1: Mplus syntax for two-level violence model

Missing are all (-9999) ;

```
Usevariables = pinci vicmale vicdrgalc vicemploy vicwhite
vicage1 vichome offmale
offfemale offboth offage offwhite offdrgalc
vicid
mot_personal mot_theft mot_influence mot_mental
mot_opportunist mot2_target mot_other
viol_grab viol_punch viol_kick viol_stab
viol_wep viol_oth sexual
daytime rel1 rel2 rel3
rel2_spouse rel2_child rel2_work rel2_rel
rel2_friend2 rel2_oth2 wep_none wep_sharp2
wep_glass2 wep_shoot2 wep_blunt2 wep_other3 loc_inside loc_outside
loc2_private loc2_other loc2_work loc3_public
x2 x3 x4 x5 inj_bruise2 inj_cuts2
inj_broken2 inj_head2 inj_oth2 ;
CATEGORICAL = pinci vicmale vicdrgalc vicemploy vicwhite
vicage1 vichome offmale
offfemale offboth offage offwhite offdrgalc
mot_personal mot_theft mot_influence mot_mental
mot_opportunist mot2_target mot_other
viol_grab viol_punch viol_kick viol_stab
viol_wep viol_oth sexual
daytime rel1 rel2 rel3
rel2_spouse rel2_child rel2_work rel2_rel
rel2_friend2 rel2_oth2 wep_none wep_sharp2
wep_glass2 wep_shoot2 wep_blunt2 wep_other3 loc_inside loc_outside
loc2_private loc2_other loc2_work loc3_public
inj_bruise2 inj_cuts2
inj_broken2 inj_head2 inj_oth2 ;
WEIGHT = wgtginc_scjs_scale_pool ;
CLASSES = cb (2) cw (4) ;
WITHIN = pinci vicdrgalc
offmale
offfemale offboth offage offwhite offdrgalc
mot_personal mot_theft mot_influence mot_mental
mot_opportunist mot2_target mot_other
viol_grab viol_punch viol_kick viol_stab
viol_wep viol_oth sexual
daytime rel1 rel2 rel3
rel2_spouse rel2_child rel2_work rel2_rel
rel2_friend2 rel2_oth2 wep_none wep_sharp2
wep_glass2 wep_shoot2 wep_blunt2 wep_other3 loc_inside loc_outside
loc2_private loc2_other loc2_work loc3_public
x2 x3 x4 x5 inj_bruise2 inj_cuts2
```

inj_broken2 inj_head2 inj_oth2 ;
BETWEEN = vicmale vicemploy vicwhite
vicage1 vichome cb ;
CLUSTER = vicid ;

Analysis:

Type = TWOLEVEL MIXTURE ;
starts = 200 75;
MITERATIONS = 200;

Model:

%WITHIN%
%OVERALL%
cw on x2 x3 x4 x5;
%BETWEEN%
%OVERALL%
cw#1 cw#2 cw#3 ON cb ;

MODEL CW:

%Within%
%cw#1%
[pinci\$1 vicdrgalc\$1
offmale\$1
offfemale\$1 offboth\$1 offage\$1 offwhite\$1 offdrgalc\$1
mot_personal\$1 mot_theft\$1 mot_influence\$1 mot_mental\$1
mot_opportunist\$1 mot2_target\$1 mot_other\$1
viol_grab\$1 viol_punch\$1 viol_kick\$1 viol_stab\$1 viol_wep\$1
viol_oth\$1 sexual\$1
daytime\$1 rel1\$1 rel2\$1 rel3\$1
rel2_spouse\$1 rel2_child\$1 rel2_work\$1 rel2_rel\$1
rel2_friend2\$1 rel2_oth2\$1 wep_none\$1 wep_sharp2\$1
wep_glass2\$1 wep_shoot2\$1 wep_blunt2\$1 wep_other3\$1 loc_inside\$1 loc_outside\$1
loc2_private\$1 loc2_other\$1 loc2_work\$1 loc3_public\$1
inj_brui2\$1 inj_cuts2\$1
inj_broken2\$1 inj_head2\$1 inj_oth2\$1];
[offage\$2] ;
[offage\$3] ;
%cw#2%
[pinci\$1 vicdrgalc\$1
offmale\$1
offfemale\$1 offboth\$1 offage\$1 offwhite\$1 offdrgalc\$1
mot_personal\$1 mot_theft\$1 mot_influence\$1 mot_mental\$1
mot_opportunist\$1 mot2_target\$1 mot_other\$1
viol_grab\$1 viol_punch\$1 viol_kick\$1 viol_stab\$1 viol_wep\$1
viol_oth\$1 sexual\$1
daytime\$1 rel1\$1 rel2\$1 rel3\$1
rel2_spouse\$1 rel2_child\$1 rel2_work\$1 rel2_rel\$1
rel2_friend2\$1 rel2_oth2\$1 wep_none\$1 wep_sharp2\$1
wep_glass2\$1 wep_shoot2\$1 wep_blunt2\$1 wep_other3\$1 loc_inside\$1 loc_outside\$1

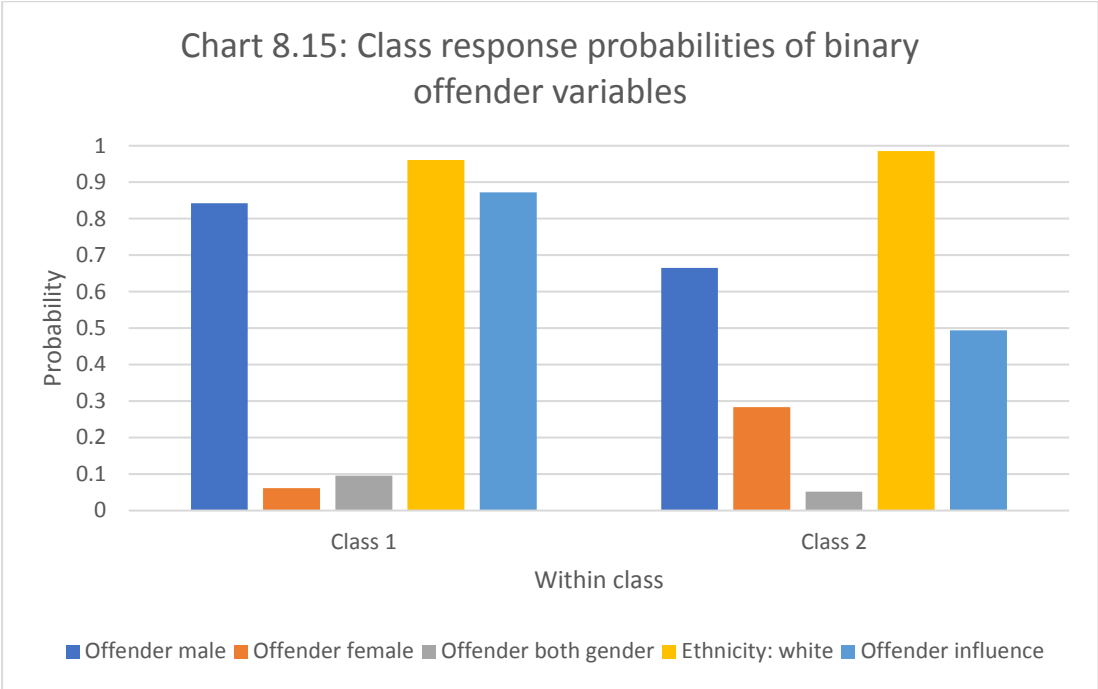
```

loc2_private$1 loc2_other$1 loc2_work$1 loc3_public$1
inj_bruise2$1 inj_cuts2$1
inj_broken2$1 inj_head2$1 inj_oth2$1];
[offage$2] ;
[offage$3] ;
%cw#3%
[pinci$1 vicdrgalc$1
offmale$1
offfemale$1 offboth$1 offage$1 offwhite$1 offdrgalc$1
mot_personal$1 mot_theft$1 mot_influence$1 mot_mental$1
mot_opportunist$1 mot2_target$1 mot_other$1
viol_grab$1 viol_punch$1 viol_kick$1 viol_stab$1 viol_wep$1
viol_oth$1 sexual$1
daytime$1 rel1$1 rel2$1 rel3$1
rel2_spouse$1 rel2_child$1 rel2_work$1 rel2_rel$1
rel2_friend2$1 rel2_oth2$1 wep_none$1 wep_sharp2$1
wep_glass2$1 wep_shoot2$1 wep_blunt2$1 wep_other3$1 loc_inside$1 loc_outside$1
loc2_private$1 loc2_other$1 loc2_work$1 loc3_public$1
inj_bruise2$1 inj_cuts2$1
inj_broken2$1 inj_head2$1 inj_oth2$1];
[offage$2] ;
[offage$3] ;
%cw#4%
[pinci$1 vicdrgalc$1
offmale$1
offfemale$1 offboth$1 offage$1 offwhite$1 offdrgalc$1
mot_personal$1 mot_theft$1 mot_influence$1 mot_mental$1
mot_opportunist$1 mot2_target$1 mot_other$1
viol_grab$1 viol_punch$1 viol_kick$1 viol_stab$1 viol_wep$1
viol_oth$1 sexual$1
daytime$1 rel1$1 rel2$1 rel3$1
rel2_spouse$1 rel2_child$1 rel2_work$1 rel2_rel$1
rel2_friend2$1 rel2_oth2$1 wep_none$1 wep_sharp2$1
wep_glass2$1 wep_shoot2$1 wep_blunt2$1 wep_other3$1 loc_inside$1 loc_outside$1
loc2_private$1 loc2_other$1 loc2_work$1 loc3_public$1
inj_bruise2$1 inj_cuts2$1
inj_broken2$1 inj_head2$1 inj_oth2$1];
[offage$2] ;
[offage$3] ;
MODEL CB:
%Between%
%cb#1%
[vicmale$1 vicemploy$1 vicwhite$1
vicage1$1 vichome$1] ;
[vicage1$2] ;
%cb#2%

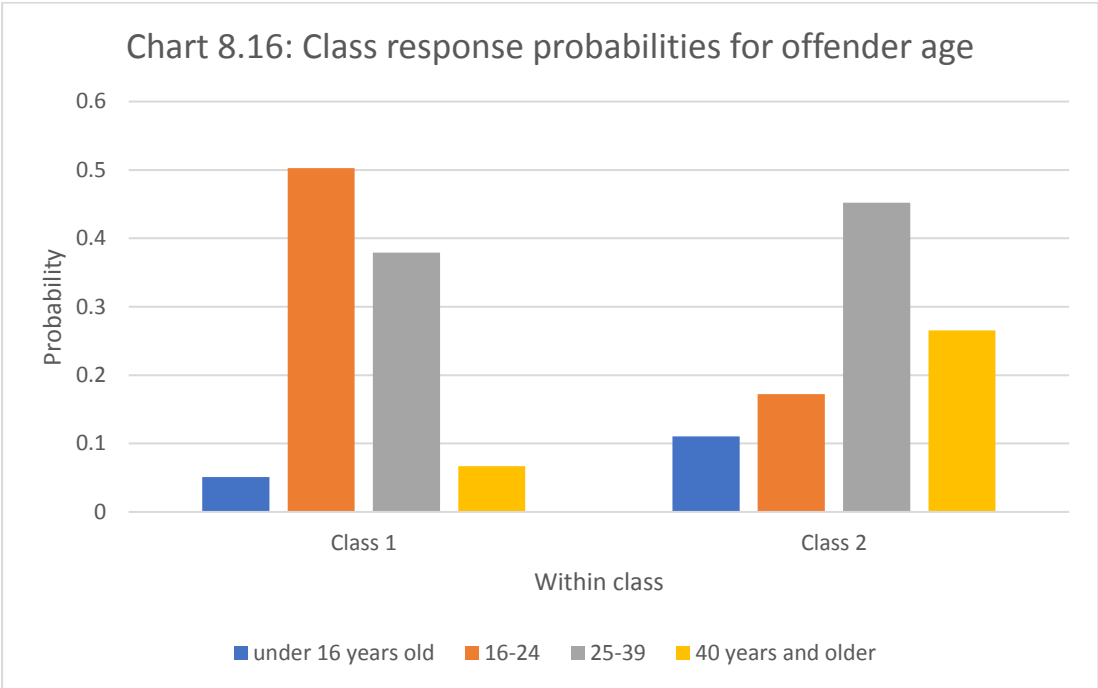
```

```
[vicmale$1 vicemploy$1 vicwhite$1  
vicage1$1 vichome$1] ;  
[vicage1$2] ;  
OUTPUT: CINTERVAL ;  
SAVEDATA:  
FILE IS violenceprob6c2-4.cla;  
SAVE IS CPROBABILITIES;
```

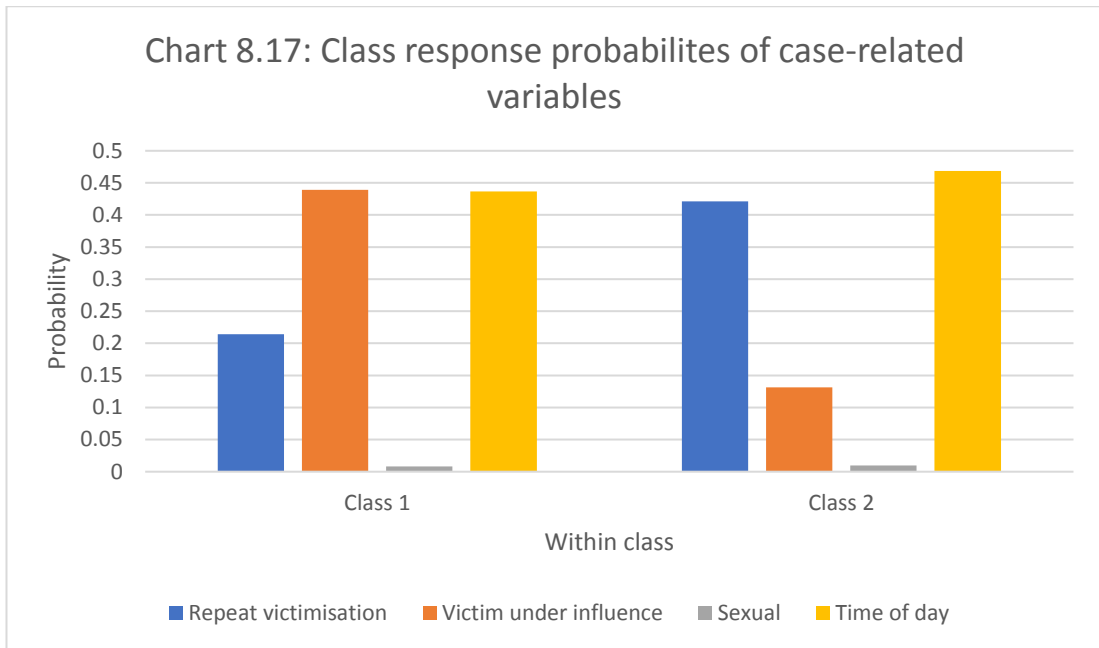

Appendix 8.2: 2-3 violence model



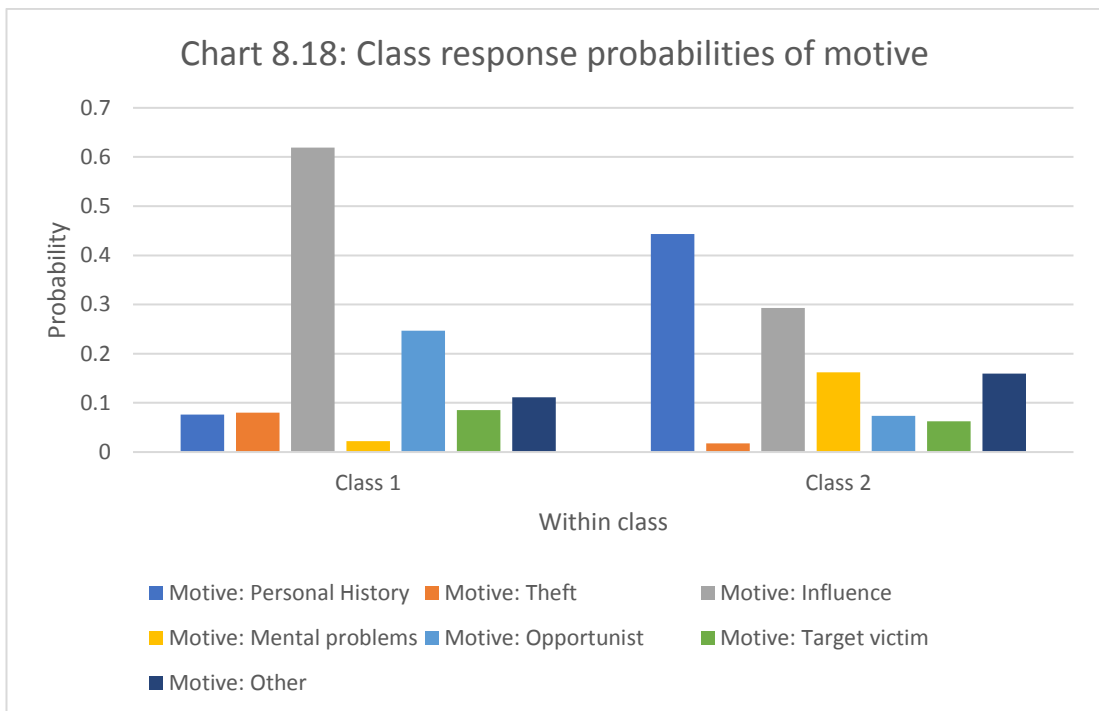
Note 1: Source: SCJS pooled dataset. Base: n=2097



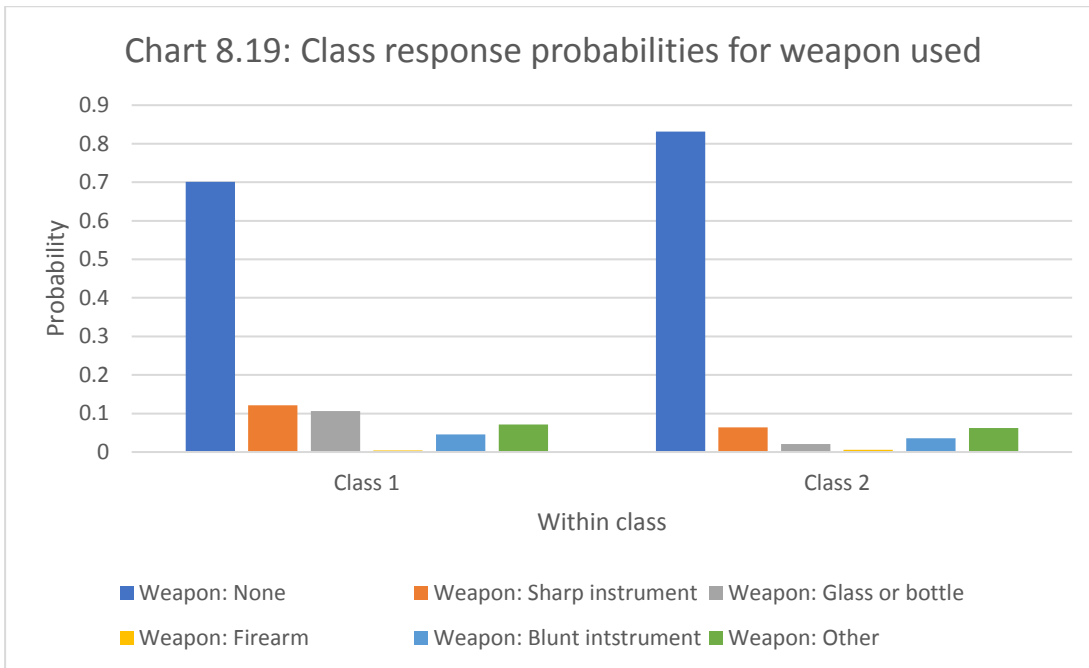
Note 1: Source: SCJS pooled dataset. Base: n=2097



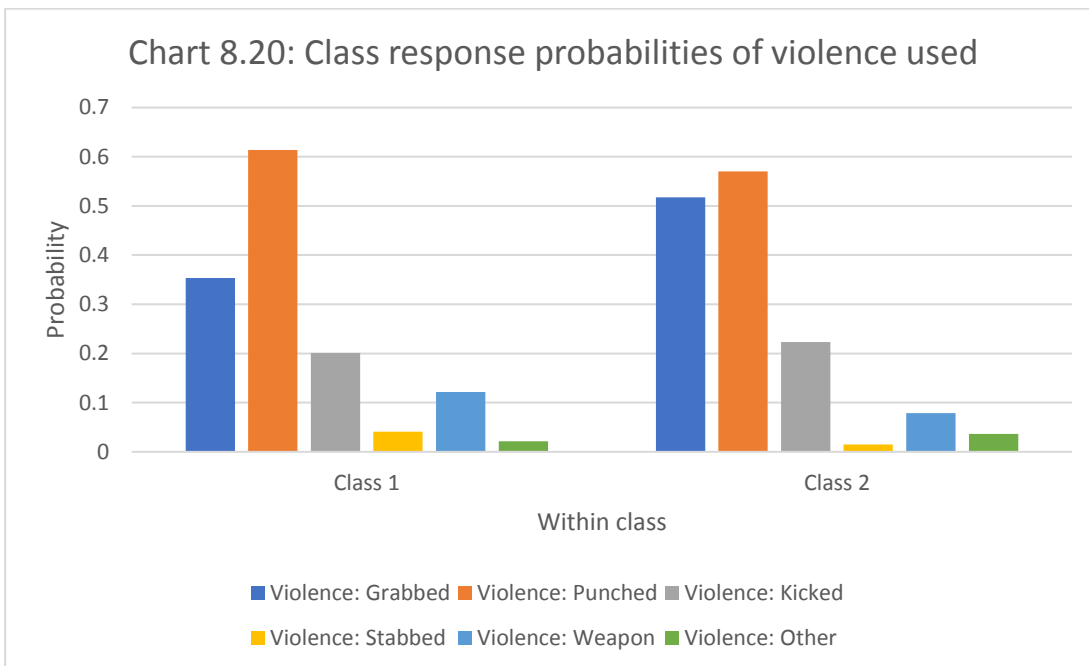
Note 1: Source: SCJS pooled dataset. Base: n=2097



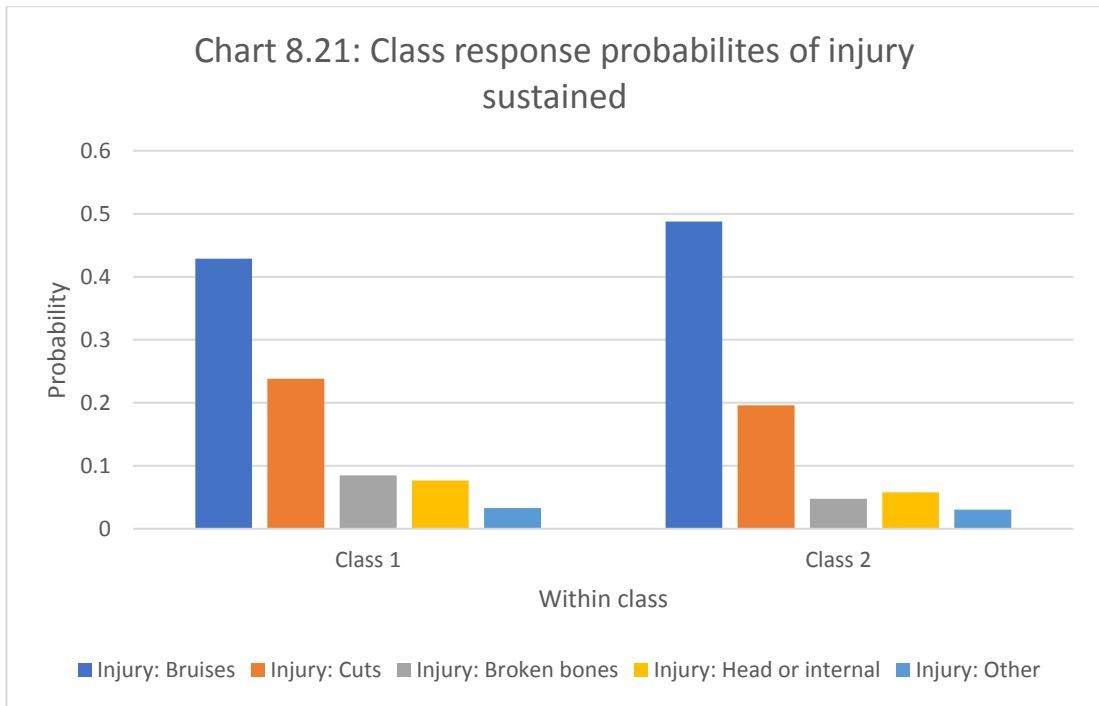
Note 1: Source: SCJS pooled dataset. Base: n=2097



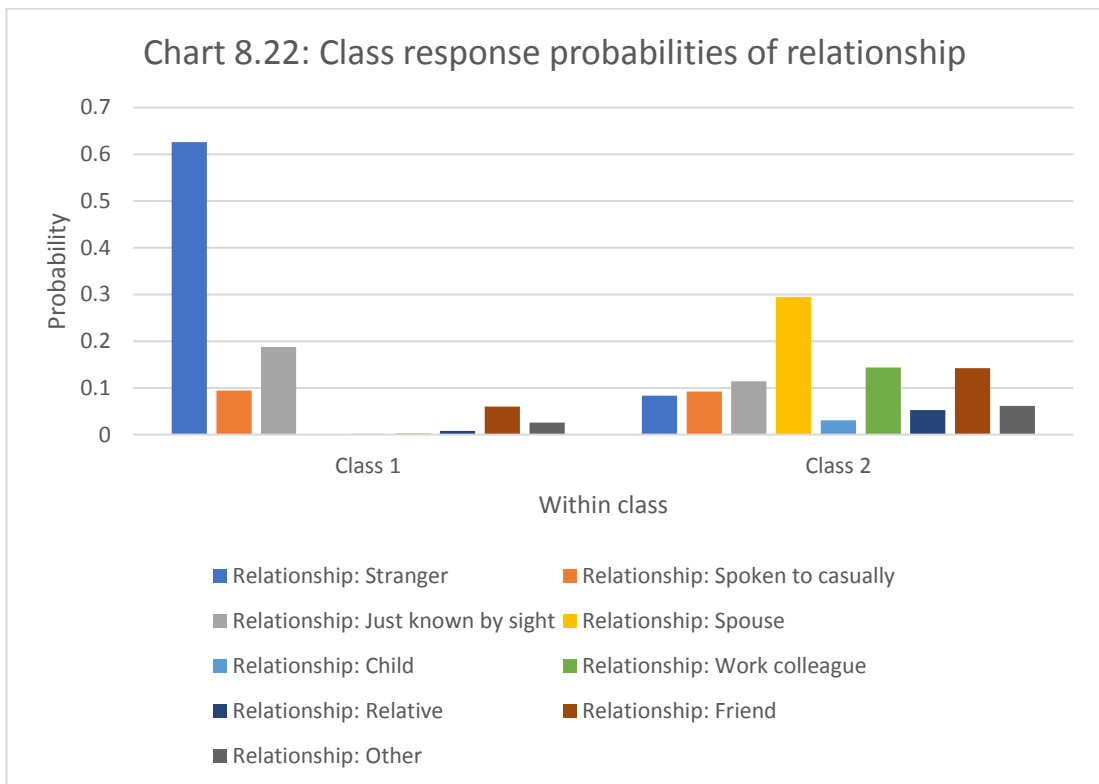
Note 1: Source: SCJS pooled dataset. Base: n=2097



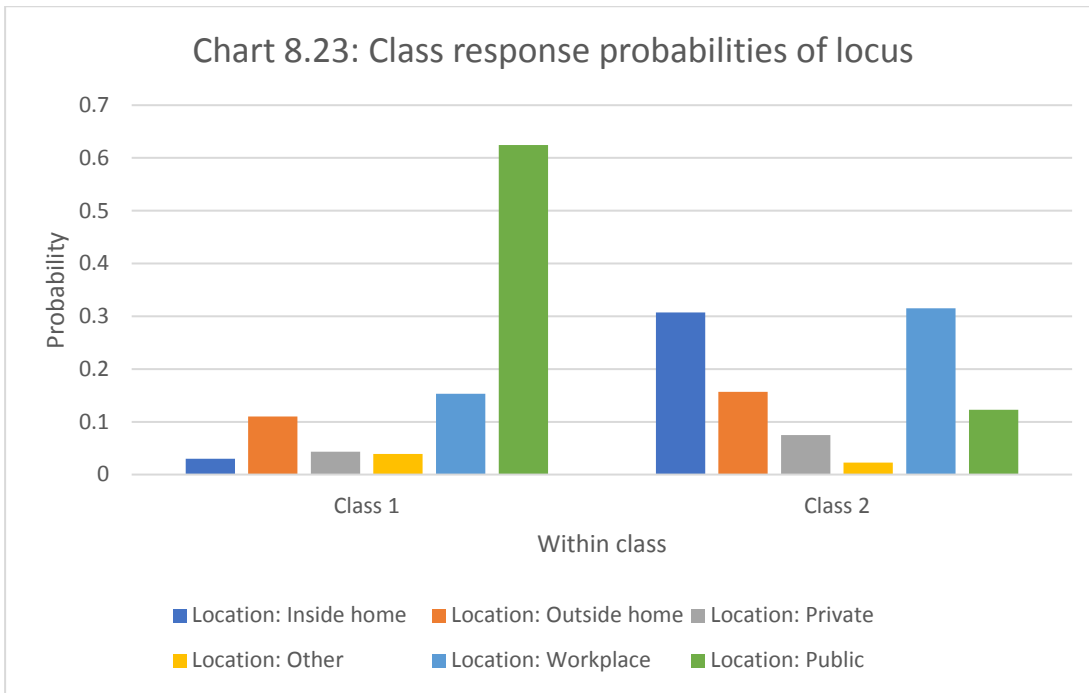
Note 1: Source: SCJS pooled dataset. Base: n=2097



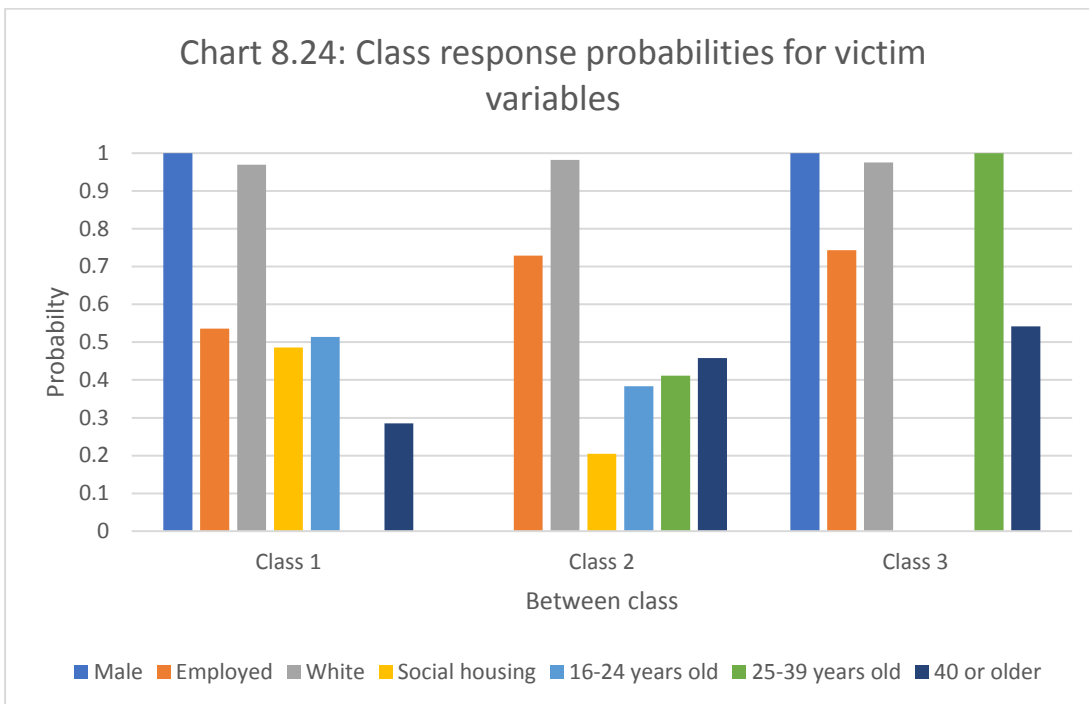
Note 1: Source: SCJS pooled dataset. Base: n=2097



Note 1: Source: SCJS pooled dataset. Base: n=2097



Note 1: Source: SCJS pooled dataset. Base: n=2097



Note 1: Source: SCJS pooled dataset. Base: n=2097

Appendix 9.1: Effect sizes for Mann Whitney U tests of homicide types

Table 9.3: Effect sizes of Mann Whitney U-tests of relative change in homicide types over time

Type of homicide	2000-2003 vs 2004-2007	2000-2003 vs 2008-2011	2000-2003 vs 2012-2015	2004-2007 vs 2008-2011	2004-2007 vs 2012-2015	2008-2011 vs 2012-2015
Stabbing	0.06 v	0.01v	0.02 v	0.03 v	0.07 v	0.03 v
No weapon-bludgeoning	0.04 v	0.11s	> 0.01 v	0.08 v	0.03 v	0.09 v
Rivalry	0.05 v	0.05 v	0.10 s	0.10 s	0.23 s	0.13 s
Femicide	0.06 v	0.04 v	0.03 v	0.10 s	0.08 v	> 0.01 v

Note 1: Source: SHD.

Note 2: Base: n=1978

Note 3: Values in bold indicates significant values

Note 4: Effect sizes calculated as: $r = z / \text{square root of } N$.

Note 5: Effect size estimated by Cohen's (1988) criteria of r , at: s = small effect (0.1); m = medium effect (0.3); and l = large effect (0.5).

Appendix 9.2: Effect sizes for Mann Whitney U-tests for violence types

Table 9.4: Effect sizes of Mann Whitney U-tests of relative change in violence types over time

Type of violence	2008-09 vs 2009-10	2008-09 vs 2010-11	2008-09 vs 2012-13	2008-09 vs 2014-15
Domestic	0.04 v	0.09 v	0.06 v	0.06 v
Public No Weapon	0.02 v	0.02 v	0.04 v	>0.01 v
Public Weapon	0.04 v	0.03 v	0.05 v	0.09 v
Work-related	0.05 v	0.03 v	0.01 v	0.05 v
	2009-10 vs 2010-11	2009-10 vs 2012-13	2009-10 vs 2014-15	
Domestic	0.05 v	0.03 v	0.02 v	-
Public No Weapon	>0.01 v	0.06 v	0.01 v	-
Public Weapon	>0.01 v	0.02 v	0.06 v	-
Work-related	0.02 v	0.06 v	0.09 v	-
	2010-11 vs 2012-13	2010-11 vs 2014-15		
Domestic	0.02 v	0.02 v	-	-
Public No Weapon	0.06 v	0.02 v	-	-
Public Weapon	0.02 v	0.06 v	-	-
Work-related	0.04 v	0.07 v	-	-
	2012-13 vs 2014-15			
Domestic	>0.01 v	-	-	-
Public No Weapon	0.04 v	-	-	-

Public Weapon	0.04 v	-	-	-
Work-related	0.03 v	-	-	-

Note 1: Source: SCJS pooled dataset

Note 2: Base: n=2097

Note 3: Values in bold indicates significant p-values

Note 4: Effect sizes calculated as: $r = z / \text{square root of } N$.

Note 5: Effect size estimated by Cohen's (1988) criteria of r , at: s = small effect (0.1); m = medium effect (0.3); and l = large effect (0.5).

Lay Summary

The lack of information about the relationship between homicide and violence was identified as a gap in knowledge almost 30 years ago. Despite this, little research has been conducted worldwide regarding this relationship on a national level since then, and the results of that research have been very contradictory. This lack of research includes Scotland, despite its unenviable reputation of being the most violent country in the Western world. Even so, many studies make unsupported assumptions regarding the relationship between the trends in homicide and wider violence. In order to fill this gap in research, the aim of the thesis is therefore to examine the changing characteristics and patterns of homicide in Scotland and to determine the extent to which changes in homicide reflect the changing characteristics and patterns in wider violence.

Overall, both homicide and violence have more than halved over the past twenty years in Scotland. But this is not just a numbers game. Due to the heterogenous nature of these crimes, although the overall picture is one of decline, there might be certain types of homicide and violence that have remained stable, or even increased over this time. In order to examine the relationship between homicide and violence in Scotland, subtypes of both homicide and violence were identified and compared over time. Two datasets were used in the current study; a homicide dataset gathered from the Scottish Homicide Database, spanning from 1990-2015, and a violence dataset gathered from pooled survey sweeps of the Scottish Crime and Justice Survey, spanning from 2008-09 to 2014-15. Subtypes of both homicide and violence were identified using variables relating to the victim, offender and to the incident of lethal and non-lethal violence. This study presents the first use of this type of quantitative technique in all criminological research.

The results identified four main types of homicide (*Stabbing homicides, No Weapon-bludgeoning homicides, Rivalry homicides* and *Femicides*) and four main types of violence (*Domestic, Public No Weapon, Public Weapon, and Work-related*). When the homicide typology and the violence typology were compared over time it was found

that although there are some differences in the subtypes identified, the overall trends in these two crimes seem to follow a similar pattern over time. A key finding from this study is that the general decrease in both homicide and violence was driven by a reduction in the same type of violence, namely violence committed by young men in public places and involving the use of sharp instruments. However, this general decrease in violence masks a hidden relative increase in both lethal and non-lethal forms of domestic violence over time.

This thesis will argue that the trends in homicide and violence indeed do follow a similar pattern over time, but that an overall picture of decline does not mean that all types of violence or homicide are decreasing equally. This has vital implications for violence policy. Improved and specific prevention strategies are needed for certain types of lethal and non-lethal violence, such as domestic violence, in order to ensure that all types of violence are prevented equally. This study will also make important theoretical contributions, in that all theories making assumptions about the trends in homicide and violence should examine disaggregated subtypes of these crimes in order to provide a holistic explanation of the changes in these crimes. Limitations of the study are discussed as well as future implications of these findings for policy and theory.

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