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a multilevel analysis

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**NEIGHBOURHOOD EFFECTS ON
ANTISOCIAL BEHAVIOUR AMONG
YOUNG PEOPLE IN ENGLAND AND
WALES: A MULTILEVEL ANALYSIS**

Jayu Jung

A dissertation submitted to the University of Bristol in accordance with the requirements for award of the degree of PhD in Social Policy in the Faculty of Social Sciences and Law, School for Policy Studies, November 2022.

80,482 words

Abstract

This study examines individual, family and neighbourhood level effects on antisocial behaviour (ASB) among young people. The prime concern of this study is identifying neighbourhood level factors that significantly explain ASB and examining their interactions with the individual and familial determinants of ASB. A sample of 9,457 young people in England and Wales (aged 14) drawn from the sixth sweep of the Millennium Cohort Study is used to answer the research questions. The dependent variable, ASB, is measured both as count and categorical variables and a series of multilevel multinomial logistic and multilevel Poisson regression analyses are then conducted to examine individual, family and neighbourhood level effects on ASB.

The findings indicate that several factors contribute to the ASB among young people. These include first and foremost markers of individual level factors (i.e., gender, illegal drug use, etc.) but also the effects of friends and family (i.e., drug taking friends, household income, parental supervision, etc.) and the impact of neighbourhood conditions (i.e., unemployment rate and housing and health deprivation). Both multilevel multinomial logistic and multilevel Poisson regression analysis results present that likelihoods of ASB are more prevalent among the young people who live in areas with high level of housing and health deprivation. Moreover, cross-level interaction results show that individual and family level characteristics' effects on ASB among the young people are altered by the characteristics of the neighbourhood they live. These findings suggest that youth policies and programmes that aim to reduce ASB should include interventions that not only better support for young people and their families, but also improve the material conditions of the neighbourhoods young people live. In addition, the results further emphasise the need for different policy responses and programmes to tackle ASB considering the unique conditions of the neighbourhoods where young people live.

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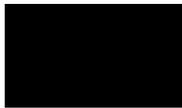
My deepest gratitude goes to my parents who have been always supportive regardless of whatever I choose to do and whether I am successful or not. I am especially grateful to Joojin, my other half, best friend and at the same time the main victim of this protracted academic journey. I know that I am always the winner whenever we have some little and big battles, but I secretly admit that it is him who always tolerates me. The most thanks go to my daughter, leun. She has totally changed my life into a much better one. She is the one who made it possible for me to live a real life during the PhD, rather than existing just to complete a PhD.

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Declaration

I declare that the work in this dissertation was carried out in accordance with the requirements of the University's *Regulations and Code of Practice for Research Degree Programmes* and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate's own work. Work done in collaboration with, or with the assistance of, others, is indicated as such. Any views expressed in the dissertation are those of the author.

SIGNED:



DATE: 1 November 2022

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Chapter 1. Introduction

1.1. Antisocial behaviour among young people in England and Wales

1.1.1. Antisocial behaviour in England and Wales

Over the past three decades, antisocial behaviour has been one of the top political issues in England and Wales and political parties on all sides have attempted to surpass each other in their strong position on the issue (Flint and Nixon, 2006; Millie, 2008; Collishaw et al., 2012; Piotrowska et al., 2012; Hodgkinson and Tilley, 2011). Moreover, it has been a successful news line for the media, which has presented the public with threatening and dangerous images of young people and, as a result, has caused a 'moral panic' among the public (Muncie, 2015; Fraser and Hobbs, 2017). The antisocial behaviour issue has become a priority in youth work and is often the basis of attracting funds to projects (Waiton, 2008). The term antisocial behaviour, which had barely been heard of in a public enforcement context prior to the 1990s, is now understood as a broad spectrum of problem behaviours, from everyday nuisances such as disturbing noises and public drunkenness to criminal behaviours, namely vandalism, littering and abusing neighbours, in a way that harms local safety and local social order (Crawford and Evans, 2012; Pople, 2012), and is perceived as being mostly conducted by children and young people (The Independent Commission on Youth Crime and Antisocial Behaviour, 2010; Pople, 2012).

Although these forms of behaviour among young people have long been viewed as a nuisance to British society, the concept of antisocial behaviour became extremely political, and was brought into the formal criminal justice system after the urban disturbances and riots in the early 1990s (Waiton, 2008; Pople, 2012). During his leader's speech at the Labour Party conference, Blair (1995) stated their tough position towards crime: "tough on crime, tough on causes of crime", which included not only violence, guns and juvenile offending but also noise and disturbances that make the local neighbourhood's life difficult. Blair's replacement, Gordon Brown (2007), also reiterated Labour's position and stressed that they were determined to do everything in their power to deal with antisocial behaviour (Millie, 2008).

More recently this dispute on antisocial behaviour has largely been replaced by concerns about violence and knife crime; however, the general approach of the government to the issue, which is risk-based and targeted, and their target group, children and young people, have remained the same. A recent, relatively minor, increase in the frequency of knife crime perpetrated by young people in some metropolitan areas has received much more media

attention than the overall steep decline in crime committed by young people (Ellis and Kyo, 2019). In addition, in responding to this issue, the Conservative government again adopted a punitive policy, for example by allowing the Metropolitan Police to use their powers of 'stop and search' to deal with this issue (Bell, 2018). Despite the fact that different political parties have developed new tougher rules to control and regulate the behaviour of young people (Muncie, 2015), concerns about young people and antisocial behaviour do not easily disappear or decrease.

While concerns about antisocial behaviour among young people are still widespread, the amount of recorded youth offending has been continuously decreasing since the 1990s. Although the number of young people in penal custody increased dramatically during the 1990s, almost doubling within a decade from 1,415 (in 1991) to 2,791 (in 2001) (Morgan and Newburn, 2007), from a longer-term perspective, recorded youth crime actually decreased by 12 per cent between 1992 and 2007 (Nacro, 2008). The decline in frequency of recorded youth offending has continued in recent years, with the custody population (aged under 18) decreasing from 2,821 (in 2000/01) to approximately 780 (in 2019/20) (Youth Justice Board, 2021) and the number of first-time entrants (those aged between 10 and 17)¹ declining from approximately 100,000 (in 2004/05) (Youth Justice Board, 2016) to around 11,100 (in 2019/20) (Youth Justice Board, 2021).²

In contrast to the downward tendency of youth crime over recent decades, the issue of antisocial behaviour, including the more recent issues of knife crime and gang involvement, has been a major concern for all of the mainstream political parties (Ellis and Kyo, 2019; Bell, 2018) and extensive legislation has been introduced to tackle antisocial behaviour, including the 1996 Housing Act, which gave social landlords the power to deal with antisocial tenants; the 1998 Crime and Disorder Act, which allowed police to disperse groups that were considered likely to behave antisocially; the 2003 Antisocial Behaviour Act, which restricted the movement and behaviour of people deemed to be antisocial; the Criminal Justice and Courts Act 2015, which introduced "mandatory custodial penalties for a second offence of knife possession for children aged 16-17 years" (Bateman, 2020, p.35); and Knife Crime Prevention Orders 2019 (introduced through the Offensive Weapons Act 2019), which allowed the imprisonment of children aged between 12 and 17 who breach the order (Millie, 2008; Bateman, 2020). However, this recent legislation shows that the main response of the UK

¹ "First time entrants (FTEs) to the youth justice system are young people aged 10 to 17 who are living in England and Wales and who receive their first reprimand, warning, caution or conviction for a recordable offence" (Sutherland et al., 2017, p.5).

² The relationship between the increasing policy interest in youth crime, the public perception towards it and actual crime tendency will be discussed in detail in section 2.1.

governments has been to tackle antisocial behaviour by focusing primarily on governing the apparently unruly behaviours of young people, based largely on a risk-based approach (discussed in Chapter 2).

Although concerns about young people and their behaviours have existed at least since the early 19th century (see section 2.1), the discourses on the drivers of youth crime are still limited within an individual and family blaming framework, as can be seen in the government's recent approaches towards youth knife crime. The government's efforts in using research evidence about the wider influences on antisocial behaviour, for example, environmental or social effects on antisocial behaviour are, in general, missing. This suggests that we still need to understand the causes and drivers of antisocial behaviour, with a greater focus on the integrated effects of not only individual but also wider social and area level conditions. Moreover, the issue of what efforts should be made to deal with antisocial behaviour needs to be further addressed, as the previous approaches, such as the risk-based and individual blaming approaches, have not solved this issue.

1.1.2. Localised approach in dealing with antisocial behaviour

Indeed, there have been some area-based initiatives aimed at tackling social problems, including antisocial behaviour, since the election of the New Labour government in 1997, which expanded beyond the traditional 'urban' or 'inner cities' policy remit (Smith, 1999).³ As a reaction to growing public concern about the so-called 'worst neighbourhoods' New Labour formed the Social Exclusion Unit in 1997 to address the problem of social exclusion, partly on the basis of neighbourhood-based solutions.

New Labour also launched a set of Area-Based Initiatives (see section 2.3), which were delivered locally in particular areas, in addition to mainstream interventions within limited boundaries (Lupton, 2003).⁴ However, this approach was viewed as an additional way of tackling the problem of deprived neighbourhoods mainly through additional, risk-based, targeted, specific and time-limited approaches (Lupton and Power, 2005). Meanwhile, 'community safety' was prioritised by New Labour in dealing with the specific issue of antisocial behaviour, which they aimed to achieve by controlling 'deviant' behaviours among young people (Crawford, 2009). Although New Labour launched the Crime and Disorder Reduction Partnerships to conduct public consultations about local problems of crime and disorder and

³ See section 2.3 for more detailed information on different government's localised approach on antisocial behaviour.

⁴ A set of Area-Based Initiatives, which were launched by New Labour includes Education Action Zones (1998), Health Action Zones (1998), Sure Start (1998), the comprehensive New Deal for Communities (1998), Excellence in Cities (1999) and Employment Zones (2000) (Lupton, 2003).

to develop strategies to tackle these problems (Crawford and Evans, 2012; Adwards et al., 2015), this localised policy and practice was criticised for its risk focused punitive approach to young people (Adwards et al., 2015; Hill and Wright, 2003) (see section 2.3).

The Coalition and the following Conservative government also adopted 'localism' in their youth policy, in an attempt to officially transfer powers and responsibilities to local authorities, communities and individuals (Davies, 2019). As a result, local authorities are now permitted more autonomy in delivering youth services but, concurrently, have to manage a considerable reduction in their budget due to austerity measures. This has led to the closure of existing programmes rather than the development of new services that specifically suit each local area's environment. Although the Coalition and Conservative governments presented their localised approach as a break from the past, there are considerable continuities in the ultimate shifting of responsibility for inequality onto local areas themselves (Jupp, 2020) (discussed in Chapter 2).

Even though recent governments have adopted some area level or localised approaches in dealing with antisocial behaviour and youth crime, the focus has been more on recognising and targeting the most disadvantaged areas rather than trying to improve the material conditions of deprived neighbourhoods and reducing the prevalent social inequalities. Moreover, localism has been used more to responsabilise local authorities and local residents rather than to allow them to develop individualised and localised services to reduce antisocial behaviour.

1.2. Defining antisocial behaviour

Although the history of the formal use of the term 'antisocial behaviour' goes back as early as the early 19th century, the modern use of the term, focusing on the threatening characters of young people and children to society and its social and moral norms, are rather more recent. During the past three decades, the term antisocial behaviour has increasingly been used by academics, media and politicians in the UK. However, the definition of antisocial behaviour is still vague and nebulous (Davidson, 2012). The modern use of the term has flexibility since it can relate to behavioural issues, crime and even incivility and, moreover, concepts regarding adolescent antisocial behaviour vary by place and change over time.

Politicians use antisocial behaviour more in relation to law-breaking criminal behaviours that require regulation and a legal approach. The media tends to focus on horrifying images of young people breaking and harming local facilities, who are out of control and a threat to local people (Muncie, 2015). To academics, it is a more complicated issue since they use various

approaches, such as the legal approach, which focuses on criminal behaviours, and the clinical approach, which focuses on externalising disorders including conduct disorder, in defining the term (Morgan, 2012; Syngelaki, 2008; Smith, 2014a).

A recent trend is to recognise antisocial behaviour within a local or neighbourhood context. Antisocial behaviour is thought to have an impact on the people 'next door' and the people on their own street (Davidson, 2012) rather than people or areas in general. The Crime and Disorder Act (1998) prioritised local safety and antisocial behaviour, which was considered to be behaviour such as groups of loitering youths, graffiti, and vandalism, which harm local safety and local social order (Crawford and Evans, 2012). The Independent Commission on Youth Crime and Antisocial Behaviour (2010) also defined antisocial behaviour as 'a broad range of persistent behaviour that causes nuisance, alarm, harassment or distress to neighbourhoods and communities as well as individuals'.

Another aspect of the use of the term is that the modern use of antisocial behaviour is mainly linked with antisocial behaviour of children and adolescents. For instance, although major government approaches in tackling antisocial behaviours such as the Antisocial Behaviour Bill were not specifically made for adolescents, their main concern was antisocial behaviour of children and young people including adolescents (The Independent Commission on Youth Crime and Antisocial Behaviour, 2010). Academic research on antisocial behaviour has also mainly dealt with antisocial behaviour of adolescents and children (Waiton, 2008) and has presented the tendency that antisocial behaviour is mainly carried out by adolescents (Moffitt, 1993).

The recent understanding of antisocial behaviour is that it encompasses a wide range of unacceptable behaviours from problem behaviours to serious crimes such as knife crime (Eastman, 2006; Home Office, 2014; Irwin-Rogers et al., 2020), which harm local safety and local social order (Crawford and Evans, 2012) and are mostly, although not exclusively, carried out by children and young people (The Independent Commission on Youth Crime and Antisocial Behaviour, 2010). More specifically, a broad range of behaviours are classified as antisocial behaviours including lying, making disturbing noise, public drunkenness, drug-taking, graffitiing, littering, abusing neighbours, physical violence, vandalism, harassment, fly-posting and taking over public space in intimidating groups (The Independent Commission on Youth Crime and Antisocial Behaviour, 2010; Home Office, 2014; Hubble, 2015). Some of them do not result in court cases or appear in the crime statistics (Rutter et al., 1998) while others are considered to be severe crimes. Some researchers have pointed out that it is important to consider behaviours outside the realm of the law and also illegal acts that do not result in prosecution as well as those that do (Rutter et al., 1998).

This definition that is used in the UK is useful as it embraces a wide range of problem behaviours. However, it has received criticism for being too generic (McAtamney and Morgan, 2009). For example, in the Crime and Disorder Act (1998), antisocial behaviour is defined as a manner that 'caused or was likely to cause harassment, alarm or distress to one or more persons not of the same household as himself'. This definition is not only too generic but also ambiguous; for example, terms such as harassment, alarm and distress make it difficult to measure and specify antisocial behaviour (Davidson, 2012).

This study adopts the current usage of the term, antisocial behaviour, which covers a broad spectrum of problem behaviours from everyday nuisances such as making disturbing noise and public drunkenness to criminal behaviours, namely vandalism and litter (Crawford and Evans, 2012), which are mostly, although not exclusively, carried out by children and young people (The Independent Commission on Youth Crime and Antisocial Behaviour, 2010). Being aware of the limitations of the current definition of antisocial behaviour, this study measures antisocial behaviour by dividing it into severe and minor forms (see Section 6.1 for more information).

1.3. Research gaps in previous studies

The importance of considering neighbourhood level effects in studying youth crime has been recognised since Shaw and Mackay (1942) tried to explain the connection between crime and community structural conditions through social disorganisation theory. This theory states that community structural conditions such as racial heterogeneity and social deprivation can be utilised to explain the behaviours of residents (Sampson and Groves, 1989; Shaw and Mackay, 1942). Furthermore, the collective efficacy model explains the connection between behavioural outcomes among young people and neighbourhood perceptions of social networks, informal control and mutual trust. The neighbourhood perceptions are the conditions of the neighbourhood that are perceived by the residents, for example, whether the residents feel safe in their neighbourhood or whether they are willing to stop children in their neighbourhood when they are doing something dangerous on the street (Leventhal and Brooks-Gunn, 2000; Sampson et al., 1997).⁵

A number of empirical studies supporting this view of social disorganisation theory and the collective efficacy model have been conducted, albeit mostly in the US. These studies have shown that young people's antisocial behaviour is influenced by neighbourhood

⁵ The theories concerning neighbourhood effects on antisocial behaviour among young people are further described in Chapter 4.

characteristics, both directly and indirectly (Winslow and Shaw, 2007; Wikstrom and Loeber, 2000). For example, some studies have found that neighbourhood level deprivation, economic disadvantage and violence between adults raise the risk of young people committing antisocial behaviour or becoming involved in juvenile delinquency (Bruce, 2004; Loeber et al., 1998) while other studies have found that high socioeconomic status reduces the risk of committing violent offences (Beyers et al., 2001) (see section 3.4 for further discussion).

Some previous researchers have also studied the connection between neighbourhood structural characteristics and young people in terms of emotional and behavioural problems, developmental behaviours, criminal behaviours, child well-being, teenage pregnancy and sexual activity in the UK (Flouri et al., 2010; Flouri et al., 2012; Flouri et al., 2014; Bradshaw et al., 2009; Carr, 2003; Arai, 2003; Leckie, 2009; Gibbons, 2002) (see section 3.4). In addition, some UK researchers have studied antisocial behaviour specifically by considering neighbourhood level characteristics, but in these studies neighbourhood factors were used as one of the control variables rather than being included as an explanatory variable in the model (see for example, Smith and Ecob, 2007; McAra and McVie, 2010) (see section 3.4). Some qualitative researchers have also tried to address the connection between neighbourhood characteristics and child outcomes such as teenage pregnancy and fertility (Arai, 2007) and antisocial behaviour (Davidson, 2012) in the UK context.

Even though some previous UK studies have tried to address the relationship between neighbourhood characteristics and child outcomes, mainly in response to concerns about increasing 'spatial polarisation'⁶ (Lupton, 2003), these studies were mostly conducted with a small number of limited structural neighbourhood factors, such as socioeconomic status, deprivation and social resources (see for example, Odgers et al., 2009) or with small samples using a qualitative approach (Arai, 2007). Qualitative studies could report young people's own understanding of antisocial behaviour in connection with neighbourhood effects but they have limited representativeness and no objectively verifiable results (Choy, 2014). Moreover, previous studies on this issue, in general, have considered structural neighbourhood factors rather than considering both structural and perceptual neighbourhood factors. Therefore, to fill a gap in the existing literature, this study investigates the effects of neighbourhood structural and perceptual factors on antisocial behaviour among young people with a sample that is representative of England and Wales.

⁶ Spatial polarisation is viewed to be caused by social polarization that "the social distance between the rich and the poor is translated into spatial segregation where low-income groups (including ethnic minorities) are concentrated in particular parts of cities" (Zwiers et al., 2015, p.3).

1.4. Research aims and questions

This study aims to address the limitations within the research literature and evidence on antisocial behaviour among young people. This study identified a variety of risk factors that are associated with antisocial behaviour among young people. Risk factors from the individual, familial and neighbourhood levels are addressed and examined using a variety of statistical analysis methods. Moreover, the prime concern of this study is to identify neighbourhood level characteristics that predict antisocial behaviour among young people at a statistically significant level, while individual and familial level factors are held constant, and to address their interactions with individual and family factors.

The shortcomings of the current understanding of individual, family and neighbourhood factors in general, and their specific relationship with antisocial behaviour among young people are tested using the sixth sweep of the Millennium Cohort Study (MCS). This secondary data analysis study will shed light on the adequacy of the existing theories on antisocial behaviour among young people within the context of neighbourhoods by applying an established methodological approach in a new research setting. Another major purpose of this study is to have a policy impact by providing evidence of the integrated effects of individual, family and neighbourhood level factors on antisocial behaviour among young people. This will allow the government and policy makers to consider making changes to the economic and social conditions of neighbourhoods where antisocial behaviour thrives, rather than focusing on risk-based individual and family level approaches that responsabilise young people and their families.

The following research questions are addressed by this study.

“What impact do individual, family and neighbourhood level characteristics have on antisocial behaviour among young people?”

Question 1-1: What are the individual and family level risk factors that are associated with antisocial behaviour among young people?

Question 1-2: What interactions are there between individual and family level factors in predicting antisocial behaviour?

Question 2-1: Does the likelihood of antisocial behaviour among young people vary across different neighbourhoods while individual and family level characteristics are held constant?

Question 2-2: If so, what are the neighbourhood characteristics that are associated with the neighbourhood level variation in antisocial behaviour among young people?

Questions 3-1: Are there neighbourhood level variations in the individual and family level factors' effects on antisocial behaviour among young people?

Question 3-2: If so, what are the neighbourhood level characteristics that significantly explain the variation in the effects of individual and family level characteristics on antisocial behaviour across different neighbourhoods?

The research questions of this study aim to address individual, family and neighbourhood level effects on antisocial behaviour among young people. Moreover, they aim to address the interrelated relationship between risk factors from the hierarchical levels in predicting antisocial behaviour (see section 5.1). Research question 1 is addressed in Chapter 7, which measures individual and family level effects on antisocial behaviour among young people. Research questions 2 and 3 are addressed in Chapter 8, which measures neighbourhood effects on antisocial behaviour among young people.

1.5. Methods and Data

This section introduces the methodology and data that are adopted to address the research questions of this study. More detailed information on the methodology and data are provided in Chapter 5.

1.5.1. Data

This research adopts a quantitative approach, specifically secondary data analysis, which uses the sixth sweep of the Millennium Cohort Study (MCS). The MCS is a representative survey of approximately 19,000 children born in the UK during the period 2000 - 2001 (Violato et al., 2011). The MCS covers diverse topics related to young people and their behaviours, and their family members and background. From the sixth sweep of the MCS, the dependent variable (antisocial behaviour), individual and family level independent variables (i.e., gender and illegal drug use), and a neighbourhood perception variable (unsafe neighbourhood) are available (Washbrook, 2010). To supplement the lack of neighbourhood structural factors in the MCS (e.g., neighbourhood unemployment rate), 2011 census data are combined with the MCS data. Neighbourhood level information from supplementary data is matched and

combined with the MCS using geographical identifiers, the Lower Layer Super Output Area (LSOA) code.⁷

1.5.2. Analysis

This study adopts a number of statistical methods to measure individual, family and neighbourhood level effects on antisocial behaviour among young people using STATA 17. To test the relationship between the categorical and count antisocial behaviour variable and individual and family level characteristics while the effects of other variables in the model are controlled, multivariate multinomial logistic regression and Poisson regression analyses are conducted (see Chapter 7). In addition, to examine the effects of neighbourhood level factors on antisocial behaviour, multilevel modelling is employed (see Chapter 8). Multilevel modelling is used since it is developed to analyse variables from different levels simultaneously, using a statistical model that appropriately includes the various dependences (Hox, 2010). In this study, for example, individuals (young people) and their households are nested in neighbourhoods.

Despite the prevalence of nested structures in social and behavioural studies, past research has often been unsuccessful in addressing them adequately in the data analysis (Raudenbush and Bryk, 2002). Largely, this neglect reflects the limitations in traditional statistical techniques in regard to the estimation of linear models with hierarchical structures. Therefore, by measuring neighbourhood level effects on antisocial behaviour, using multilevel modelling, this study contributes to the existing literature on antisocial behaviour among young people in the neighbourhood context.

1.6. Thesis Outline

Chapter 2 examines discourses surrounding antisocial behaviour and the policy response towards antisocial behaviour among young people in England and Wales. It starts by introducing the broad discourses of youth crime and the construction of criminal justice towards young people from the nineteenth century to the 1980s. It then describes the political/ideological construction of antisocial behaviour among young people in more recent years - from the 1990s to the present period - and explains its historical manifestations in the public debate, policy and practice. It also addresses how policy and practice in England and Wales has dealt with antisocial behaviour among young people since the 1990s.

⁷ Please refer to section 5.2 for detailed information on the supplementary datasets and LSOA.

In Chapter 3, empirical evidence of the individual, family and neighbourhood level determinants of antisocial behaviour among young people is reviewed.

Chapter 4 introduces theoretical frameworks that help to enable an overall understanding of antisocial behaviour trajectories among young people. It first introduces the social ecological theory to explain how young people's behaviours, including antisocial behaviour, are widely influenced by interactions with the immediate and wider environment. It further describes the process models of neighbourhoods, namely social disorganisation theory, social capital theory and collective efficacy model. The introductions to these models provide a useful view in understanding how neighbourhood conditions influence the occurrence of antisocial behaviour.

In Chapter 5, the methods that are utilised to answer the research questions and test the model are described. The research questions are introduced at the beginning, and this is followed by the explanations of the main data, the MCS and the supplementary data, the 2011 Census data, which is matched and combined with the MCS using geographical identifiers. It also introduces the dependent variable and explanatory variables that were selected for the antisocial behaviour model. The research model of this study, which is based on the existing state of knowledge reviewed in Chapter 4, is also presented. The chapter also introduces the measurement models (the multilevel statistical models) that are adopted in this study. The ethical considerations in conducting the study and using the MCS are addressed at the end of the chapter.

Chapter 6 develops a validated antisocial behaviour measurement using a variety of relevant tests and presents the descriptive analysis results, which address the characteristics of the study sample.

Chapter 7 addresses the first research question formulated for this study. It investigates how the prevalence of antisocial behaviour varies according to the individual and family level characteristics of the participants. Simple and multivariate multinomial logistic regression and Poisson regression analyses are conducted to identify the association between each individual and family level explanatory variable and the dependent variable.

Chapter 8 describes the research questions that are formulated to address neighbourhood level effects on antisocial behaviour among young people. A number of multilevel analyses are used to answer the research questions. Multilevel random intercept models are used to address the effects of neighbourhood level factors on antisocial behaviour and multilevel random effects models are used to address the interactions between individual and family and neighbourhood level factors in predicting antisocial behaviour (cross-level interaction).

Chapter 9 explains how the findings contribute to the literature in this field and draws comparisons with the existing evidence. Implications arising from the analyses for policy, theories, future research in this area are identified and a discussion of recommendations for future research is made.

Chapter 10 considers the extent to which the key findings of the study have addressed the research questions, and also highlights the areas in which the study has developed the evidence base and how this may be used within a policy and programmatic context.

Chapter 2. The Construction of antisocial behaviour in England and Wales

Since the early nineteenth century, when British society began to construct problematic behaviours among young people as one of the main ‘threats’ to the social order (Hendrick, 2015; Muncie, 2015), there have been attempts to understand apparent antisocial behaviour among young people. However, the concept of antisocial behaviour is socially constructed and, as such, the definition of what constitutes antisocial behaviour varies: it can relate to behavioural issues, criminal activity and/or incivility. Moreover, a concept of antisocial behaviour varies from place to place and changes over time (Nixon et al., 2003; Home Office, 2004). In order to understand antisocial behaviour as a social problem, comprehending the inter-connected relationships between the role of politics, the public and the institutions of society is essential (Waiton, 2008).

Therefore, this chapter aims to examine discourses surrounding antisocial behaviour and the policy response towards antisocial behaviour among young people in England and Wales.⁸ In detail, this chapter aims to explore the wider discourses surrounding youth crime since the 19th century and the ‘antisocial behaviour agenda’ of the current period. In addition, by studying recent policy responses towards antisocial behaviour, this study aims to understand the presumptions that underpin the main policies of different governments and how these approaches define and explain antisocial behaviour among young people.

Section 2.1 outlines the broad discourses of youth crime and the construction of criminal justice towards young people from the nineteenth century to the 1980s in England and Wales, including the development of the terminology used to describe young people’s unwanted behaviour. Section 2.2 analyses the ideological and political context of recent discourses on antisocial behaviour and policy and societal attitudes towards young people, which have been reshaped by a series of events, for example, urban disturbances in the early 1990s and more recently knife and violent crime. The recent youth policy and practice responses towards antisocial behaviour are discussed in sections 2.3 and 0 respectively.

⁸ In this chapter, discussions of policy responses to youth antisocial behaviour are considered separately for England and Wales since different countries in the UK respond differently when it comes to criminal justice (Garside, 2015). The UK has three separate legal systems, namely England and Wales, Scotland and Northern Ireland. England and Wales share the same legal system although there are some devolved powers in Wales since 2007, as a result of the passage of the Government of Wales Act 2006 by Parliament. The Justice Secretary and Home Secretary in the UK government only have responsibility for criminal justice in England and Wales with a few essential exceptions.

2.1. The social construction of youth crime in England and Wales

The 1990s witnessed the proliferation of the term antisocial behaviour, particularly in relation to youth and young people's behaviour.⁹ However, as Squires (2006a) argues, antisocial behaviour is not a new issue of the late modern society, although the history of the concept of antisocial behaviour has been neglected in the recent antisocial behaviour discourses. Thus, acknowledging that a public debate on problematic behaviours of young people began in the early 19th century and how the recognition of youth antisocial behaviour has changed over time depending on the social and political circumstances provides a framework for understanding current antisocial behaviour discourses and related policy responses. Thus, this section introduces historical discourses of youth crime from the 19th century up to the 1980s.

From the early 19th century, certain behaviours of adolescents began to be represented as one of the major social threats and specific terms such as juvenile delinquency were formed (Hendrick, 2015; Muncie, 2015; Newburn, 2007). These new concerns about 'troublesome youth' were formed by the combination of social changes in the 19th century and the perception that a stage of life, adolescence, which was newly identified in the early 19th century, together with a station in life, class, were the causes of misbehaviour (Springhall, 1986). Concerns about a lack of discipline and the increasing independence of wage-earning working class adolescents were growing and the development of street-based leisure, such as street gambling and football pursuits, were believed to result in delinquency, hooliganism, and criminality (Muncie, 2015).

The term 'hooliganism' illustrates how antisocial behaviour among young people was understood by the public in the late 19th century. Allegedly, the word 'hooliganism' entered into common English usage after the August bank holiday celebrations in 1898, when large numbers of people were brought to court for attacks on the police, disorderly behaviour, drunkenness and street robberies (Pearson, 1983). The newspapers picked up the term, which came to be used to describe troublesome youth behaviours that had previously been ascribed to 'ruffians' or 'roughs'. During this period, young people were thought to be increasingly vulgar, more unruly and undisciplined (Howard Association, 1898). People were increasingly anxious about the visible presences of young people on the streets, especially young people from the working class (Muncie, 2015).

⁹ Since antisocial behaviour is a relatively new term, other terms such as 'juvenile delinquency', 'troublesome youth', and 'hooliganism' that had been used prior to 'anti-social behaviour' are introduced in this section.

In the early 20th century, the press reported that communities were horrified by gangs of hooligans and the Home Office was concerned about the prevalence of juvenile crime (Muncie, 2015). The growing problem of juvenile delinquency, from truancy to assault and theft, became an established topic for British academics (Burt, 1925; Pearson, 1983). The early studies on juvenile delinquency focused on individual characteristics such as mental health problems and young people's family background (Hendrick, 2002).

During the period between the early and mid-20th century, the discourses on delinquent behaviours were led by the 'underclass' (or 'dangerous class') discourse. Underclass groups were viewed to be in long-term poverty, to often be involved in criminal behaviours, and to have drug and/or alcohol problems (Morris, 1994).¹⁰ During this period, underclass or working class young people, rather than youth in general, were viewed as dangerous or delinquent and delinquency was implied to be primarily an underclass phenomenon that was caused by their 'problem family' (Johnson, 1980; Welshman, 2007). For example, the irresponsibility of working mothers was highlighted as one of the reasons that drove their children to become delinquent (Pearson, 1983). Failure in socialising their children and ineffective parenting by underclass parents were considered to be the major causes of delinquent behaviour (Case, 2018). Parental responsibility was formalised by legislation, for example the Children and Young Persons Act 1933, which established the courtroom as "a site for adjudicating on matters of family socialisation and parental behaviour" (Muncie, 1984, p.45).

The post-war period up to the 1970s is "often described in terms of the cult of youth, the youth spectacle, the teenage revolution and similar phrases" (Hendrick, 2015 p.8). This period saw the birth of the successive promotion of subcultures of young working class males including 'Teddy Boys (1950s)', 'Mods (early 1960s)' and 'Skinheads (1960s-1970s)' (Hendrick, 2015 p.8). In the 1950s, Teds were described as showing no respect for authority and making the street and the local 'caff' their territory, which concerned the public. They were described as engaging in violent, deprived and sex-crazed behaviours (Muncie, 2015). In the 1960s, the violent behaviours of Mods and Skinheads together with vandalism, truancy, drug use, revolts by students, sexual permissiveness and football violence were often described as evidence of the deteriorating youth condition (Muncie, 2015; Newburn, 2007). It was groups of young criminals, black youth, punks, muggings and school violence in the 1970s (Muncie, 2015) together with large numbers of young people gathering and rioting on the streets in the 1980s that amplified the level of public concern.

¹⁰ For more information on 'underclass' discourses, see Johnson (1980), and Welshman (2007).

Policy responses to antisocial behaviour during the post-war period up to the 1970s were mainly influenced by care and welfare measures (Case, 2018). For example, the Children and Young Persons Act 1948 established a local authority childcare service (Case, 2018; Hendrick, 2015), and later on, the Children and Young Persons Act 1963 promoted a focus on “responding to offending through social work based therapeutic relationship building” (Case, 2018, p.150) and raised the age of criminal responsibility to 10. The subsequent Children and Young Persons Act 1969 gave more focus to social services over criminal justice agencies and sought to raise the age of criminal responsibility to 14. However, a change of government to Conservative (from Labour) in 1970 affected the implementation of the Children and Young Persons Act 1969, which meant that its intention of raising the age of criminal responsibility and abolishing borstals and detention centres was not fully implemented. Responses to youth crime during this period shifted from a welfare oriented approach to governing family and its problematic children (Rose, 1990; Gelsthorpe and Morris, 1994).

It is thus apparent that the recent antisocial behaviour agenda in regard to tackling knife crime and drug taking and the discourses surrounding young people, especially negative narratives, are not totally new phenomena. As shown by the underclass discourses of the early and mid-20th century, perspectives on delinquent behaviour among young people were focused mainly on dangerous individuals and their problematic family; societal and environmental effects on the problematic behaviour were mainly excluded from the discourses. The next section describes how the antisocial behaviour agenda was reignited in the early 1990s and whether there have been other attempts to understand antisocial behaviour in a broader context rather than responsabilising individuals and their families.

2.2. The ideological and political context of recent discourses on antisocial behaviour

Since the 1990s, academic and political debates and public concerns towards the apparent antisocial behaviour among young people have increased significantly, even though recorded youth crime in general has been continuously declining during the past three decades (discussed later in this chapter). The policy rhetoric has been dominated by a discourse about disruptive and unruly young people (Muncie, 2004) and more recently about the serious effects of knife and violent crime (Harding, 2020) and, year on year, young people are identified by surveys on public attitudes, including the Crime Survey for England and Wales, as disorderly and threatening (Brown and Bolling, 2007; Flatley et al., 2008). Interpretations of antisocial behaviour that connect the everyday nuisance behaviour of young people with a wider sense of disorder and social breakdown are used to explain the problem, and the unruly behaviours

of them have become increasingly interconnected with the issue of crime, and, since the mid-1990s, have been brought into the criminal justice system (Waiton, 2008).

2.2.1. New Labour and (re) creation of antisocial behaviour

In the early 1990s, the growing public concern about antisocial behaviour among young people, for example, joyriding, under-age children drinking of alcopops, the arguably widespread use of drugs such as Ecstasy, 'ladette culture' and girl gangs, and persistent offending, was further provoked by several specific events (Muncie, 2015). Well-publicised urban disturbances - including in Blackbird Leys (Oxford), Ely (Cardiff) and on the Meadowell estate (Tyneside) - took place first in 1991, and focused attention on large groups of young people confronting the police (Newburn, 1996). Not long after these urban disturbances, in 1993, the infamous murder of the toddler James Bulger by two ten-year-old boys occurred, which horrified the public and detonated public concern about antisocial behaviour among young people (Muncie, 2015). The media described it as a national crisis (Jenks, 2005) and this murder case touched the fundamental issue of the juvenile welfare-justice debate as well as causing the rebirth of populist punitiveness (Morgan and Newburn, 2007). Thereafter, low-level antisocial behaviours that had not previously been recognised as a serious social problem began to arouse public concerns and finally resulted in tough law and order reforms (Newburn, 1996; Muncie, 2015).

The concept of antisocial behaviour, which previously had not been a major topic of the policy discourse, became prominent when New Labour adopted it in the 1990s (Squires, 2006b; Johnstone, 2016). Antisocial behaviour, which used to be widely considered somewhere between law breaking and moral misconduct, was brought into the formal legal system and started to be directly linked with crime. "Disorderly conduct, incivilities, rowdy public behaviour and minor criminality" (Johnston, 2016, p.717), which were not then major concerns of government institutions, were dragged under the antisocial behaviour banner (discussed in section 2.3). Largely inspired by 'Left Realism' (Lea, 2015) and 'broken window theory' (Wilson and Kelling, 1982), New Labour asserted that antisocial behaviour was heavily influencing the quality of life in local communities, and thus it should not be ignored. Regarding this issue, they stressed the importance of community safety, which was based on exclusion that marginalised poor communities (Lea, 2015). As Left Realists have argued, New Labour focused on the situation facing poor communities (Lea, 2015) and on the individual rather than the social causes of crime (Young, 1992) (discussed further in Section 2.3.1). The political rhetoric and legislative activity concerning antisocial behaviour thrived as Tony Blair and his government enthusiastically supported the deployment of the coercive power of the government to rebuild respect and enhance quality of life (Blair, 2010).

Meanwhile, academic researchers, many from the area of urban studies (e.g., Millie, 2008; Squires, 2006b; Burney, 2005), questioned the issue of antisocial behaviour. Squires (2006b), for example, criticised the government's approach to antisocial behaviour, which treated antisocial behaviour as if it were new. According to Squires, the government lacked an understanding of the history of the concept of antisocial behaviour and had not made an effort to understand the young, often disadvantaged, people who were most frequently labelled by the antisocial frame. He further asserted that the new curfew and dispersal orders did not simply seek to control the antisocial or criminal behaviour of young people, but rather, their aim was to have complete control over their behaviour. Brown (2004) also argued that antisocial behaviour was being constructed in official discourse as a specific form of offending behaviour, which gave the police and prosecutors and the criminal justice system the right to use force and to take effective action against antisocial behaviour.

These arguments were crucial in pointing out how antisocial behaviour was socially constructed. In addition, they clarified the value-laden relationship between antisocial behaviour and young people by providing evidence that young people are often claimed to be causing neighbour nuisances where actually most complaints are made by "established households of families with children against other families with children" (Scott and Parkey, 1998, p.342).

These claims argue that the current notion of antisocial behaviour labels certain group of people, mainly children and young people in a negative way, and certain areas, including council housing areas, as 'antisocial'. For example, New Labour introduced measures to tackle antisocial behaviour, described as crime control, which focused primarily on young people from social housing areas. This emphasises the importance of locality in comprehending the antisocial and anticipated impact that these classifications might have on identity of the individuals.

Meanwhile, the New Labour government introduced legislation to develop new mechanisms to restrict antisocial behaviour in England and Wales based on a positivist approach¹¹ (discussed further in section 2.3) (McAnulla, 2007). This approach was often used to identify the causes of abnormal behaviours and disorders (Case, 2018). The New Labour government assumed that they could define the patterns of the problematic behaviours and eventual outcomes, which then they could control (Bevir, 2005). New Labour also drew on right realism to locate the antisocial behaviour agenda by considering it as one of the individual flaws. The focus was placed on the responsibility of individuals (Burney, 2005). The government's stance

¹¹ See Case (2018) for more information on positivism.

on this problem was clearly stated in the following quote from the Respect and Responsibility White Paper: “The common element in all antisocial behaviour is that it represents a lack of respect and consideration for other people. It shows a selfish inability or unwillingness to recognise where one’s individual behaviour is offensive to others and a refusal to take responsibility for it” (Home Office, 2003, p.17). New Labour tried to understand the antisocial behaviour agenda broadly based on a positivist view so that they could define the risk factors of antisocial behaviour and make sure that young people and their families took responsibility for themselves.

2.2.2. After New Labour: Antisocial behaviour discourses in recent years

Despite the continuous decline in the custody population (aged under 18) from approximately 2,800 in 2001 to under 860 in 2020 as well as the decrease in the number of first-time entrants¹² (aged under 18) from approximately 100,000 in 2005 to 11,000 in 2020 (Youth Justice Board, 2016; 2017; 2021), concerns around apparent antisocial behaviour among young people continued to exist in the 2000s and onwards. This time it was the possession of knives, video gaming, underage binge drinking, cyber-bullying, mini-moto riding, happy slapping, boy racers, hoodies, feral jobs, vandalism and the use of status dogs as weapons that caught the public’s attention (Muncie, 2015). Large scale riots, characterised by the tendency of young people in big groups to express their anger by damaging public or private facilities, also took place in 2011. This time, the riots were triggered by the death of a 29-year-old man, Mark Duggan, who was shot by police in Tottenham, in August 2011. A conflict between a large group of people and the police deteriorated into riots throughout London and other cities in England (Muncie, 2015). Antisocial behaviour among young people was once again highlighted and it was the class and race of these young people that was deemed to be the core cause of such violent behaviours. In other words, the riots were believed to be led by young people from deprived families and disadvantaged areas (Muncie, 2015; Ministry of Justice, 2012) and were often claimed to be caused by certain racial groups, for example, those from an African-Caribbean culture (Murji and Neal, 2011). However, some academics, for instance Newburn (2012), opposed this claim, arguing that “*there were a great many poor communities and marginalised people who did not riot*” (p.334). These riots were again picked up aggressively by the media (discussed in section 2.2.3) and acted as a reminder of the past urban disturbances, which led the public to consider young people as dangerous and irrational (Lacey, 2012).

¹² “A first-time entrant is a young person who has received their first reprimand, warning, caution or conviction for an offence processed by a police force in England or Wales or by the British Transport Police. Other sanctions given by the police are not counted.” (Youth Justice Board, 2016, p.9)

In recent years, antisocial behaviour is discussed in the context of serious offending, violence and knife crime (see for example, Irwin-Rogers et al., 2020; Timan, 2021). For example, youth knife crime and serious offending have become an issue of concern, reflected within a considerable increase in numbers of recorded offences. Between 2016 and 2017 recorded knife and sharp weapon related crime increased by 22% in the UK (Straw, 2018). There were 285 recorded knife-related homicides in 2018, which was the highest since the Home Office Homicide Index started in the 1940s. Knife related homicides committed by young males under 18-years-old increased by 77% between 2016 and 2018 (Brown, 2019). In London, the number of homicides associated with gang violence increased between 2014 and 2018 from 17 to 44, and deaths caused by shooting increased from four to 15 during the same period (Densley et al., 2020). While the current levels of knife crime and serious violent crime are considerable, they are relatively low compared to other countries, and comparatively stable when considered historically (Irwin-Rogers et al., 2020). However, knife crime has often been described as an ‘epidemic’ that is uncontrollable (Rogan, 2021) and youth knife crime in some metropolitan areas has received intense media attention (Ellis and Kyo, 2019) despite the continuous downward tendency of youth crime in general. Knife crime is described as occurring more in the large metropolitan cities, especially in some deprived areas, and young working class people, again mainly from deprived groups, are identified as the typical perpetrators, and as being dangerous and reckless (Case and Haines, 2019; Ellis and Kyo, 2019).

Although the discourses surrounding antisocial behaviour is discussed in the context of knife crime and violence, yet the same/similar risk factor approach is being adopted to identify and target young people. Young people engaged in antisocial behaviour and/or knife crime are becoming the new ‘folk devils’, which influences policy responses. The government’s approach to dealing with this agenda has focused on individual or family level risk factors concerning individuals’ mental health and behavioural problems together with the family effects on young people. These are the similar approaches used to tackle antisocial behaviour while ignoring the potential impact of the toxic environments caused by austerity (Ponsford et al., 2019; Case and Haines, 2019) (see section 2.3).

2.2.3. Youth crime and the media: Moral panic and the deviancy amplification spiral

The series of disturbances that took place in the early 1990s (discussed above) were spotlighted by an angry mass media and reshaped traditional public concerns towards young people and their antisocial behaviours. During this time, the headlines in the press included: ‘One-boy crime wave’, ‘Mini-gangster is beyond our control’, ‘We’ve got too soft’ and ‘Children

are supposed to be little innocents-not crooks in short trousers' (Newburn, 1996). The murder of the toddler James Bulger by two ten-year old boys was also given widespread and overwhelming newspaper coverage. More recently, the reporting of knife crime by the media has suggested that the UK is experiencing an epidemic, for example, "London is being gripped by a knife crime epidemic" (The Sun, 2018); and "The rise in youth knife crime should be treated as an emergency" (The Independent, 2018).

The sensational media reports of the unruly and uncontrolled image of young offenders escalated public fears as well as influenced the political mood, which was followed by legislation aimed at controlling young offenders, for example, the Crime and Disorder Act 1998 and the Offensive Weapons Act 2019 (Newburn, 1996; Muncie, 2015; Bateman, 2020) (discussed later in section 2.3).

During the 1990s, youth justice, especially penal policy, began to be used as a political competition. To surpass one another, politicians came up with various laws and regulations, namely "curfews for children, the naming of young offenders in court, parenting orders, fast-track punishments for persistent offenders, the adoption of zero tolerance campaigns to prosecute even the most petty and minor offences and so on" (Muncie, 2015, p.7). All of the measures were enacted over the next ten years and the number of children held in secure institutions more than doubled between 1993 and 2003 (from around 1300 to over 3000) (Muncie, 2015). In recent years, the Conservative government has taken a tough stance towards knife crime and gang activities; for example, the Knife Crime Prevention Orders 2019 allow 12-17 year old children to be sent to prison for breach of the order (Bateman, 2020).

As discussed earlier, politicians develop harsh penal policies for various reasons, mostly in order to derive strategic political advantage (Jones, 2012). During the 1990s, the use of a tough 'law and order' image brought subsequent electoral success to Labour. The harsh youth justice policies in England and Wales enacted from the early 1990s onwards were connected with the political decisions of the then-Conservative Government in response to pressure from the Labour Opposition, who were trying to attract the electorate on the basis of their relatively new 'tough on crime' slogan (Newburn, 2007; Downes and Morgan, 2007a). The recent government's tough approach on knife crime and gang issues could be understood as attempts to be seen to be doing something about social problems (Case, 2018).

Some researchers have tried to address the relations between offending behaviour, the media and public fear. Cohen (1972) came up with the term 'moral panic' to explain the role of the mass media in shaping and defining social issues. According to Cohen, the media's reporting of specific news could sufficiently create worry, anger, anxiety or fear. He further explains the

media's influence on creating moral panic and folk devils by bringing about the process of 'deviation amplification', which was described by Wilkins (1964). According to Wilkins (1964), those in authority stereotype minority groups as being destructive with the aim of using public fear, and begin to offer a well-known remedy to the problems, which is taking a tougher position towards crime. The increased attention can support the media's initial punitive view on the issue but at the same time it can result in the subject group feeling more and more segregated. This alienation gets worse when policy makers and other opinion leaders request tougher rules to punish and control offenders and stress the predictable dangers if they do not control the 'deviants'. Such public accusations may encourage the group to feel more condemned and alienated, and increase their offending activity, such that they appear to turn to more like the 'beings' originally described by the media. This persistent offending concerns police and brings increased numbers of arrests and more sensational media reporting (Muncie, 2015). Therefore, a "deviance amplification spiral is set in motion" (Jewkes, 2015, p.87).

How the UK media describes young people can be identified from quantitative content analysis of British newspapers. For instance, the Charity Children's Express (1999) examined more than 400 stories about children and young people in national and local newspapers. They discovered that young people were regularly described as 'demons', 'victims', 'brave', 'cute', 'brilliant' or 'adult accessories' (Neustatter, 1998; Muncie, 2015). MORI (2005) conducted a study of 17 newspapers and found 603 articles concerning young people during one week in August 2014. They stated that the majority of the articles (71%) had a negative tone and that approximately 30 per cent of them considered young people in the context of antisocial behaviour or violent crime. Research commissioned by Women in Journalism (2008) showed that more than 50 per cent (4,374 out of 8,629) of the discussions about young boys in national and regional newspapers were related to crime. The expressions most frequently used to depict young people were "yobs" (591 times), 'thugs' (254 times), 'sick' (119 times) and 'feral' (96 times). Other terms included 'hoodie', 'louts', 'heartless', 'evil', 'frightening', 'scum', 'monsters', 'inhuman' and 'threatening'" (Muncie, 2015, p.10). Young people had the chance to receive sympathetic coverage only when they died.

Some unique characteristics of the British media market raise the possibility of exaggerated and emotive crime reporting compared to other European countries (Muncie, 2015). The extremely competitive character of the British popular press market where the majority of newspapers being sold from shops and news-stands (rather than via subscriptions, as in Norway) provides newspapers with an incentive to create shocking headlines and leading stories so that they can grab the attention of passing customers. Specific structural conditions of the news market lead to extreme and sensational reporting of criminal behaviours virtually

unavoidable (Reiner, 2007). Indeed, there have been calls for media regulation in the UK, including in the Leveson report¹³ (Leveson, 2012). However, newspapers still use sensational stories concentrating on extreme and sexual crimes, as an effective and promising way of selling a copy (Jones, 2012). One example is the media reporting of the August 2011 riots: the Daily Mirror (9 August 2011) reported that ‘Yob Rule’; the Daily Mail (11 August 2011) declared that “feral” children run wild in the streets of UK cities’; the Daily Mirror (13 August 2011) reported ‘Anarchy in the UK – teenage wasteland’; and the Daily Express (15 August 2011) said, ‘hooded youths in pitched battles with police, all reason gone and high on destruction’. The press criticised ‘offensive hooligans’, poor parenting and unruly teenagers and demanded a harsh response (Muncie, 2015). Whilst discussions of crime have continuously occupied a major proportion of media reporting, the rising political significance of tabloid newspapers has become critical to British crime politics in recent period. The political significance of the tabloid press was a key factor in shaping Tony Blair’s nomination of a former political editor of the Daily Mirror as his press secretary (Muncie, 2015).

While the Labour government constructed antisocial behaviour as a critical policy challenge in responding to public fear and outrage about youth crime, the 2005 Crime Survey for England and Wales (CSEW) revealed the level of public fear in regard to antisocial behaviour among young people (Office for National Statistics, 2005). In the survey, around 20% of adults thought that there to be high levels of antisocial behaviour in their neighbourhood and the most frequently recognised antisocial behaviour for the respondents was “young people hanging around” (31%).

However, the first nationally representative public opinion survey concentrating specifically on youth crime and justice in England and Wales showed lack of public awareness about real youth antisocial behaviour (Hough and Roberts, 2004). This survey showed that a vast majority (around 70%) of the respondents believed that the number of youth offenders had gone up recently. However, in reality the number of young people brought into youth justice system decreased during the recent years. A tendency to overestimate the proportion of recidivism by young offenders and the prevalence of youth crime accounted for by violent crimes was also found. As with crime in general, there is a tremendous degree of public ignorance about ‘the actual story’ of youth crime and justice (Roberts, 2004). It is thus argued that this public ignorance about actual crime tendency and fear towards crime allows

¹³ Although the Leveson inquiry was conducted as a response to the 2011 phone-hacking scandal, the Government has commissioned reports several times to deal with concerns about the press (Leveson, 2012) and criticism of extreme and exaggerated crime reports has been made by several researchers (Pearson, 1983; Franklin and Petley, 1996; Cohen, 2002; Jewkes, 2015; Muncie, 2015).

politicians to trumpet harsh and punitive policies to handle young offenders (Roberts, 2004). To do otherwise would be to commit electoral suicide.

Some research evidence has contended that public opinion about crime and punishment is led by politicians rather than vice versa. For example, looking back to the change towards hardening law and order policies in the USA in the 1970s, it has been shown that changes in the official political discourse on crime and penalties actually pre-dated the increase in punitive public attitudes as assessed by opinion polls (Beckett, 1997). It could be said that the punitive penal policies towards antisocial behaviour since the 1990s and the related political rhetoric are not simply a response to punitive public opinion; rather, they also generate punitive public opinions towards antisocial behaviour and youth crime.

2.2.4. Troublesome youth? The recreation of antisocial behaviour in recent periods

Cross-sectional surveys show that public attitudes towards crime and punishment in some countries are consistently more punitive than in others and the UK public appear to have the most punitive attitude towards crime among all of the European countries (Jones, 2012). Meanwhile, as discussed above, growing evidence suggests that the UK public have a limited understanding of antisocial behaviour and youth crime issues (see Roberts, 2004; Roberts and Hough, 2002; Rogan, 2021). Thus, the punitive discourses on youth offending in England and Wales since the 1990s have been mainly influenced by the punitive policy rhetoric on youth offending in order to attract voters, and the anger and fear of the public, who are informed and manipulated by the media, which trumpet shocking stories of youth crime including the urban disturbances and the Bulger case of the 1990s, and, more recently, knife crime and gang activities (Wilkins, 1964; Cohen, 2002; Rogan, 2021).

While the arrival of New Labour brought legislation aimed mostly at controlling young offenders, there have been some attempts to improve the welfare of young people. Some policies have been noted for their punitive and criminalising stance towards young people, for example, “the abolition of *doli incapax*, the embracing of the antisocial behaviour agenda, and the shift away from pre-court measures”, while a more restorative based approach has also been applied “at the pre-court and post-sentencing stages of the system” (Morgan and Newburn, 2007, p.1055). Based on the discourses on antisocial behaviour discussed in this section, how youth justice policy and practice in England and Wales has responded to antisocial behaviour and youth crime is described in the following section.

2.3. Recent policy response to antisocial behaviour

Although it has been more than two centuries since certain behaviours of young people started to arouse concerns from society (Hendrick, 2015; Muncie, 2015; Newburn, 2007), the British government is still struggling to tackle the issue of antisocial behaviour. In the 2019 Crime Survey for England and Wales, 39% of the respondents replied that they had experienced or witnessed some sort of antisocial behaviour in their local area and nearly 15% expressed their concerns about young people hanging around on the streets (Office for National Statistics, 2019; 2005). The youth justice system is characterised as ineffective and cost-inefficient and is still facing the traditional dilemma of whether care for young people should come first and justice for young perpetrators should come later, or vice versa (Muncie, 2015).

In this section, the major policy responses towards antisocial behaviour from the 1990s until today are examined. During the past three decades, a wide range of youth justice legislation, policy and practice has been introduced. However, the recent punitive policy concerning youth crime has been shaped more by the different governments' political strategies than by actual crime tendencies. Thus, this section reflects on how the antisocial behaviour agenda has been used as a political agenda item since the 1990s and how it has been responded to by the recent governments.

2.3.1. New Labour and youth justice policy

After coming to power in 1997, Labour introduced a new way of tackling youth justice, 'What matters is what works' (Stephenson et al., 2011), and declared their plan to use an evidence-based approach to policy and practice (Wells, 2007).¹⁴ They instantly started consulting on a series of reforms that could reduce costs and improve performance (Graham, 2012). Within a year, the Crime and Disorder Act 1998, the first and foremost influential reform, which fundamentally reshaped the youth justice system, was passed. This Act was favoured by the police since it allowed them to use more powers to control young offenders, however it was criticised by youth justice scholars, youth justice pressure groups and, welfare agencies on the basis that it demonised and damaged young offenders and their parents (Muncie, 1999; Souhami, 2015).

Graham (2012) categorised the main changes that the 1998 Act made into five themes. First, the Act broadened the criminal responsibility of young offenders as well as their parents, abolished *doli incapax*, which made the shift from a more child-focused approach to

¹⁴ The Youth Justice Board revealed their devotion to using an evidence-based approach, mentioning that Effective Practice Guidance for Youth offending teams will be made based on empirical evidence (Youth Justice Board, 2001).

considering children and young people as fully responsible for their behaviours, and presented a new civil order concerning antisocial behaviour. Second, restorative justice interventions, namely mediation, reconciliation and reparation were brought into the youth justice system and later embodied in the 1999 Criminal Evidence Act. Third, more investment was made in the prevention of offending and reoffending and a number of interventions for early intervention¹⁵ were introduced. Fourth, almost in line with the former government on this issue, New Labour tried to expand control over young people by stressing the necessity of punishment when they break the law. Finally, the Youth Justice Board was set up to monitor the operation and performance of the youth justice system.

Through the Crime and Disorder Act 1998, New Labour initiated Antisocial Behaviour Orders (ASBO), which were immediately criticised for their legal form and potentially punitive approach (see Downes, 2007). They were part of the punitive measures developed under the Blair administration, which also led to a noticeable rise in indeterminate sentences and imprisonment (Burney, 2008). ASBOs were also argued to be designed especially to deal with juvenile antisocial behaviour (Morgan and Newburn, 2007). By the end of 2005, more than forty percent of the ASBOs issued had been in respect of those aged under 18 (Parr and Nixson, 2008). ASBOs also targeted young people from deprived families, those with alcohol and drug problems, and families with criminal records and the government often viewed poor parenting as a main cause of antisocial behaviour and focused on the improvement of parenting skills (Parr and Nixson, 2008).

In designing this order, the Labour government decided to move prosecution to the civil court system, rather than the criminal justice system, which they viewed ineffective in tackling persisting neighbourhood nuisances. They also restricted alleged offenders with tailor-made restraints imposed by the threat of punishment (Simester and von Hirsch, 2006). Among others, Simester and von Hirsch (2006) criticised the uniquely punitive stance of ASBOs and expressed concerns about the prohibitions, which often had a very harsh influence on the lives of the receivers, for example, “a curfew or expulsion from an area (suburbia, shopping centre, personal property, or even one`s home)”. It was also argued that the orders often disproportionately targeted people with mental disabilities, self-harming people and young people (Burney, 2008). Another criticism made against ASBOs was that they allowed hearsay evidence that supported allegations of persistent and serious offending and crime by young people in their neighbourhoods. Whilst hearsay evidence can be permitted in civil cases, the

¹⁵ For example, additional youth crime prevention programmes, such as Youth Inclusion Programmes and Youth Inclusion and Support Panels were initiated by the Act.

appellants in *Clingham and McCann*¹⁶ have argued that given the potential critical consequences of an ASBO, it should not be allowed under criminal procedural rules of evidence, as governed by Article 6 of the European Convention on Human Rights relating to the right to assess witnesses (Burney, 2008). Moreover, the practice of publicising ASBOs with the recipients' personal information including names, addresses, or even photographs was condemned as it adds an explicitly humiliating character to the punitive experience (Pratt, 2000). ASBOs were also heavily criticised by the Council of Europe's Commissioner for Human Rights (Gil-Robles, 2005), who demanded that the government reform the ASBO guidelines to secure the children's privacy right by prohibiting the public release of posters reproducing images of young people submitted in relation to ASBOs.

The government also introduced the Antisocial Behaviour Act 2003, which further aimed to protect neighbourhoods and communities. Although community safety was the given reason, in fact, it has been argued that the Act was more about controlling children (Jerrom, 2007). Through the Act, the police gained powers to disperse a group of two or more young people (aged under 16) considered to be acting antisocially, even if they were not committing a crime or creating a disturbance (Squires, 2008; Downes and Morgan, 2007b) and new powers were given in regard to "crack houses, fireworks, airguns, misbehaving tenants, spray painting, and parents of truants" (Waiton, 2008, p.151). Significant numbers of ASBOs were given out after the introduction of the antisocial behaviour legislation. It was claimed by the former chair of the Youth Justice Board, Rod Morgan, among others, that the increase in the number of young offenders brought into the formal system in 2004 was in part due to the violation of ASBOs; although ASBOs were a civil order, breach of an ASBO was a criminal offence that could result in an immediate custodial sentence (Jerrom, 2007). The number of ASBOs issued more than doubled from under 1,500 in 2003 to over 3,400 in 2004 and reached its highest level in 2005.

Although New Labour attempted to tackle antisocial behaviour through ASBOs, the order was not successfully adopted during the early stages, as can be seen from the low numbers of Antisocial Behaviour Order applications in the first few years, which stayed below 500 from 1999 to 2002 (Ministry of Justice, 2011). The number of Antisocial Behaviour Order applications then rose significantly, reaching 4,122 in 2005 after New Labour encouraged local agencies to use their enforcement powers. Although the number of ASBOs awarded increased, and New Labour applied pressure to apply the measures, the use of ASBOs by local agencies never satisfied the expectation of the government: just 18,670 ASBOs were applied between 1999 and 2009 (Ministry of Justice, 2011). In addition, sixty percent of the total Antisocial

¹⁶ [2002] UKHL 39

Behaviour Order applications were related to convictions after criminal proceedings rather than being standalone ASBOs. Matthews et al. (2007) explained that local agencies preferred the application of ASBOs after conviction following criminal proceedings due to their procedural convenience and cost-effectiveness.

Meanwhile, in dealing with the issue of antisocial behaviour, New Labour also adopted a localised approach. New Labour reacted to the growing public concern about the so-called 'worst neighbourhoods', which were characterised by concentrated impoverishment and unemployment and related issues of high levels of disorder and crime, declining and malfunctioning services, and urban and environmental decay. The Social Exclusion Unit was formed in 1997 to address problems of social exclusion, partly on the basis of neighbourhood-based solutions. The Social Exclusion Unit report, *Bringing Britain Together* (Social Exclusion Unit, 1998) identified approximately 3,000 neighbourhoods that were suffering from common problems of crime, poverty, worklessness and poor health and revealed a large gap between the most deprived local authority districts and others.

New Labour also launched a set of Area-Based Initiatives, which were delivered locally in particular areas, in addition to mainstream interventions within limited boundaries (Lupton, 2003).¹⁷ Despite the programmes' unique features, including their proliferation and emphasis on community involvement and leadership and on joining-up services at the local level, this first stage of policy can be viewed as continuing the general approach of preceding governments; that is, tackling the additional problems of deprived neighbourhoods mainly through additional, targeted, specific and time-limited approaches (Lupton and Power, 2005).

Meanwhile, in dealing with the specific problem of antisocial behaviour, community safety was New Labour's priority, which they sought to achieve by controlling 'deviant' behaviours among young people such as vandalism, graffiti, drug or alcohol use in public, making noise in a neighbourhood area and hanging around in groups on the streets. New Labour required local governments and other responsible authorities to work in partnership with the police and created Crime and Disorder Reduction Partnerships to conduct public consultations about local problems of crime and disorder and to create strategies to deal with these problems (Crawford and Evans, 2012; Adwards et al., 2015). Despite considerable central government investment, this localised policy and practice were criticised for its punitive approach to young people. For example, in most community safety strategies, the problem of young people hanging around was a constant area of concern (Adwards et al., 2015) and the strategy mainly

¹⁷ A set of Area-Based Initiatives, which were launched by New Labour includes Education Action Zones (1998), Health Action Zones (1998), Sure Start (1998), the comprehensive New Deal for Communities (1998), Excellence in Cities (1999) and Employment Zones (2000) (Lupton, 2003).

reflected the interests of adults while excluding the stance of marginal groups such as 'dangerous youth' (Hill and Wright, 2003).

At the same time, highly uneven developments of localised policy and practice were found across England and Wales, despite the central government's intention that it would be a national project. The major limitations of Crime and Disorder Reduction Partnerships included the reluctance of some authorities to participate; an unwillingness to share information; conflicting interests and priorities among different agencies; local political differences; budgetary pressures; and a lack of appropriate skills and expertise (Skinns, 2005).

As this sub-section addressed, the main approach that New Labour took to tackle antisocial behaviour can be summarised as punitive, risk-based, controlling, targeting and responsabilising. Despite the great effort made by New Labour in tackling antisocial behaviour, the following governments tried to show that they were doing something different from the previous government (New Labour) and developed different regulations to deal with antisocial behaviour.

2.3.2. The Coalition and Conservative: The rebirth of austerity

The Conservative-LibDem Coalition Government, which came into power in 2010, emphasised effective punishment, rehabilitation, and effective sentencing and claimed that their plan represented a fundamental break with the *"failed and expensive policies"* of the past (Ministry of Justice, 2010, p.2). They put austerity measures at the heart of their governing and their youth justice policy was heavily influenced by the austerity approach (Mason, 2015). The Coalition aimed to keep children out of the justice system and out of custody by: "reducing the number of first time entrants to the youth justice system; reducing reoffending; and reducing custody numbers" (Ministry of Justice, 2010, p.75). As a result, there was an apparent decline in youth crime under the Coalition government. For instance, during the first two years of their government, between 2010 and 2012, there was a decrease of nearly 36 percent in the number of children (aged under 18) who received a formal conviction or out-of-court disposal for an indictable offence, from 73,712 to 47,019 (Ministry of Justice, 2013; Bateman, 2014).

However, this downward tendency in youth crime under the Coalition, and more widely since the late 1990s, should be interpreted with caution, since there is a complication in understanding detected youth crime, as Bateman (2014, p.418) has stated:

Policy change has a considerable influence on the treatment of children in trouble and impacts the degree to which they are drawn into the youth justice system or diverted

from it. Patterns of detected offending may not therefore mirror changes in young people's criminal activity. Equally, perceptions of the prevalence of youth crime — largely derived from official data — can affect youth justice policy.

These complicated interactions help to address patterns in detected youth crime under the Coalition government, and the increased tolerance towards young offenders could be understood by the effects of austerity (Bateman, 2014). Under the Coalition, in dealing with youth crime, the responsibility of local authorities and communities was highlighted, and market mechanisms were used to the youth justice system to deal with the extreme budget reductions.

The core approach of the Coalition was presented in the Green Paper, '*Breaking the Cycle: Effective punishment rehabilitation and sentencing of offenders*' (Ministry of Justice, 2010). In this paper, they stated the importance of early intervention, parents' responsibility, a restorative approach, the effective use of sentencing, simplifying court disposals and a localised approach to offending behaviour. In 2013, they published a new consultation paper promoting education as an essential route to rehabilitation and reducing re-offending, and stressed the need for a combination of preventative early intervention, punishments for breaking the law, and rehabilitation (Grimwood and Strickland, 2013). In the following year, the Antisocial Behaviour, Crime and Policing Act 2014 was legislated, which reformed the existing antisocial behaviour powers and replaced them with injunctions, community protection notices, dispersal powers, criminal behaviour orders, and public space protection orders (Muncie, 2015). As a result, the infamous Antisocial Behaviour Order (ASBO) was finally abolished and replaced with the new 'Crime Prevention Injunction (CPI)' (Case, 2018). The CPI was considered to be different from the ASBO since it included positive prerequisites for the young person to address the root cause of their offending; for example, there was a requirement to attend appointments to address substance use issues, rather than prioritising negative prohibitions and restrictions. However, the CPI was criticised as being no more than a rebranded ASBO (Case, 2018) as it duplicated many of the original mechanisms connected to the ASBO, most noticeably in its compulsory character, which "exacerbates the potential for breach (although breach is not a criminal offence; it constitutes contempt of court)" (Case, 2018, p.249) and further criminalisation of children and young people.

In 2015, a Conservative-majority administration succeeded the Coalition government but continued the previous youth justice policies, emphasising the importance of education, the prevention of offending, and partnership between local and national government as well as with young people and their families, the courts, police, health, education, victims, and the

third sector (Youth Justice Board, 2016). Youth justice policy, as well as other areas, has continuously experienced the government's austerity measures. The annual budget of the Youth Justice Board in 2016 was reduced by 11 percent in comparison with the previous year, persisting the trend of a year-on-year budget cut and, in the longer term, its annual budget decreased by 72 per cent between 2011 and 2018 from £452.3 million to £126.6 million (Youth Justice Board, 2018). Moreover, the annual grant to Youth Offending Teams decreased from nearly £145m to less than £72m between 2011 and 2019.¹⁸

The changes related to austerity are claimed to be one of the underlying causes of the recent increase in knife crime (Ponsford et al., 2019) (see section 2.2.2). Researchers such as Stephen Case and Kevin Haines (2019) argue that knife crime is caused by the toxic environment created by politicians and by the politics of austerity (e.g., recent cuts to youth services). Irwin-Rogers et al. (2020) also claim that the public spending cuts and regressive social policy reforms resulting from the recent austerity measures are acting as important drivers of knife crime and serious violence. They argue that "rising school exclusions and cuts to education budgets, cuts to youth services and counterproductive funding structures, and the police's fervent use of stop and search, constitute forms of antisocial control" (Irwin-Rogers et al., 2020, p.5-6).

As a response to concerns about knife crime and gang violence, the current configuration of antisocial behaviour, a number of laws and related approaches have been introduced. For instance, the Criminal Justice and Courts Act 2015 introduced mandatory custodial penalties for a second offence of knife possession for young people aged between 16 and 17. The Offensive Weapons Act 2019 introduced Knife Crime Prevention Orders, which allow the imprisonment of children aged between 12 and 17 who breach the order. The punitive approach of such legislation has been criticised. For example, the National Association for Youth Justice expressed their concerns regarding the introduction of the acts, saying that "responses to children in conflict with law continue to be tempered by the remnants of an underlying punitive ethos, as manifested" (Bateman, 2020, p.9). In 2018, the Home Office published a new Serious Violence Strategy - which does not seem to be entirely new, as, again, it attempted to measure 'risk and protective factors' - which focuses on 'early intervention and prevention' and local partnerships (HM Government, 2018).

¹⁸ Austerity impact on youth service and practice are described in section 0.

Table 2.1 Key changes in youth justice legislation, policy, and practice since the 1990s

Legislation, policy and practice	Key features
Crime and Disorder Act 1998	- widened criminal responsibility (e.g., the abolition of <i>doli incapax</i>) - initiated Antisocial Behaviour Orders (ASBOs) - launched Youth Justice Board and introduced restorative justice - invested in early intervention and prevention
Criminal Justice and Court Services Act 2000	- introduced exclusion orders - increased penalties for parents of truanting children
Criminal Justice and Police Act 2001	- introduced penalty notice for disorder and designated public place order - extended powers to remand in custody
Police Reform Act 2002	- Interim ASBOs
Antisocial Behaviour Act 2003	- consolidated the range of enforcement powers - initiated dispersal order; child curfew order; graffiti removal order; parenting order
Criminal Justice Act 2003	- initiated individual support order - expanded drug testing to children and parenting orders - increased sentencing powers
Children Act 2004	- enacted every child matters agenda - launched Children's Commissioner for England and Wales
Serious Organised Crime and Police Act 2005	- allowed abolition of anonymity of children in case of the breach of ASBOs
Violent Crime Reduction Act 2006	- initiated drinking banning order - introduced alcohol-related directions to leave area
The Respect Action Plan 2006	- formalised the support of early intervention to tackle antisocial behaviour
Youth Crime Action Plan 2008	- aimed earlier intervention and non-negotiable intensive parenting support - introduced a 'triple track' initiative advocating tougher enforcement and punishment
Criminal Justice and Immigration Act 2008	- introduced the youth conditional caution and initiated the youth rehabilitation order - introduced two statutory alternatives to custody: intensive supervision and surveillance; intensive fostering
Policing and Crime Act 2009	- expanded police powers to move young people from a public place - initiated new powers for the police and local authorities
Antisocial Behaviour, Crime and Policing Act 2014	- replaced ASBOs and produced a success of injunctions and criminal behaviour orders
Criminal Justice and Courts Act 2015	- introduced mandatory custodial penalties for a second offence of knife possession for children aged between 16 and 17
Offensive Weapons Act 2019	- initiated Knife Crime Prevention Orders - allowed to imprison children aged between 12 and 17 with the breach of the order

Note: The contents of this table are in part adapted from (Crawford, 2009, p.817) and (Muncie, 2015, p.304-5)

In dealing with knife crime and serious violence, the government adopted a 'public health' approach that considers knife crime and serious violence as an individual disorder or disease that needs to be dealt with using medical treatment. Knife and violent crime is considered to be perpetrated by 'problematic' children who need to be fixed. (Case and Haines, 2019). Researchers such as Case and Haines (2019) claim that both of these approaches to

the knife and violent crime issue are counter-productive and harmful and suggest that approaches to knife crime should be concentrated on the young people and the wider environment that influences them. Thus, in dealing with this 'new' form of antisocial behaviour (albeit this is actually not a new issue), the government also needs to consider research evidence about wider influences on antisocial behaviour such as neighbourhood and social effects.

This section introduced how the policy of England and Wales has responded to youth crime over the past few decades. The key changes in youth justice legislation, policy and practice since the 1990s are presented in Table 2.1 below. As demonstrated above, the swathe of legislation enacted to handle and control the apparent antisocial behaviour among young people in the 1990s reshaped the youth justice system significantly and reinforced control over young offenders. Since 2010, youth justice has been hugely influenced by the fiscal austerity programmes and, as a result, the roles of local government, community and parents have been heavily extended, with a renewed emphasis placed on rehabilitation and risk-based early intervention (Mason, 2015; Kelly and Armitage, 2015; Case, 2018). The Coalition Government's less punitive policy on criminal justice, including the youth justice system, reflects the budgetary pressures associated with austerity, rather than any recognition that a large, punitive and intrusive criminal justice system might be inherently unhelpful or problematic (Roberts, 2015).

The Government's approach to the issue of knife and violent crime shows how the understanding and approach to antisocial behaviour remains similar to previous decades. The discourses on the drivers of youth crime are still limited and set within an individual and family blaming framework, as can be seen from the government's approach towards youth knife crime. There appear to have been limited attempts by the government to utilise research evidence about wider influences on antisocial behaviour, for example, environmental or social effects on antisocial behaviour, and we still need to further develop our understandings of the causes and drivers of antisocial behaviour to guide future policy and interventions. Recent youth justice practice

2.4. Recent youth justice practice

The policies introduced above were accompanied by developments in practice, which are discussed here. This section first analyses the consequences of recent governments' risk-factor based approach to youth justice practice by introducing some youth programmes. They include, for example, the early intervention schemes that were launched by New Labour as an effort to develop a 'new model of public services', which were later adopted and further

developed by the Coalition and the following governments. In addition, the role of localism and neighbourhood level intervention in delivering these programmes is examined. The section further addresses the post-2010 government's economic policies and the effects of 'austerity' on youth practices and services.

In order to create new structures that could modernise, shape and deliver a new model of youth justice, New Labour established the Youth Justice Board (YJB) (see section 2.3) and local authority youth offending teams (YOTs). While the YJB was created to take a strategic leadership role in overseeing and managing the youth justice system, YOTs were in charge of the majority of day-to-day youth justice practice and services. Before 1998, the youth justice teams, mainly consisted of local social workers had responsibilities to work with young offenders (Case, 2018). The two major roles of YOTs were "to coordinate the provision of youth justice services for all those in the local authority area who needed them, and to perform functions allocated to the team in the youth justice plan produced by the local authority" (Morgan and Newburn, 2007, p.1034).

The new category of antisocial behaviour created by New Labour has been described by Case (2018) as a "catchall category to facilitate early intervention by identifying individuals (typically young people or problem families) whose behaviour was borderline criminal or otherwise problematic (annoying, nuisance, threatening and causing harassment) to communities and/or persons not in their household" (Case, 2018, p.204). In this regard, New Labour relied upon the results of studies that emphasise the association between early and persistent offending and, later, more serious criminal career (see for example, Farrington, 1994; 1992; 1990). In response, a number of early intervention schemes that aimed to reduce antisocial behaviour and crime and to prevent offending and criminalisation in general were established (Morgan and Newburn, 2007).

For example, the YJB launched Youth Inclusion Programmes (YIPs) in 2000 as risk-based early intervention/prevention programmes for young people aged between 8 and 17 living in 114 neighbourhoods in England and Wales (Case, 2018). YIPs aimed to prevent offending and reoffending by engaging with the fifty young people in each neighbourhood who the key agencies identified as at high risk of offending. Any agency involved in youth work, particularly the formal agencies of the police, local authorities and health agencies had a responsibility to make a referral to a YIP. These key agencies identified young people who had offended, as well as those who are likely to offend in the future, or to experience social and/or educational exclusions (Morgan Harris Burrows, 2003, in Case 2018). By recognising the young people who are mostly likely to offend, the YIP aimed to specify the risk factors surrounding them that led young people towards offending and crime and to provide "positive activities, offending

behaviour programmes, and improved access to services, particularly education” (Morgan and Newburn, 2007, p.1036).

Another early intervention programme, the Youth Inclusion and Support Panel (YISP) was formed in 2003 in England and Wales as a multiagency committee consisting of representatives of the key agencies (police, education, social services, health and the YOT) to work with children and young people. The aims of the YISPs were to prevent antisocial behaviour and offending by young people aged between 8 and 13 who were recognised to be ‘at risk’ of offending by supporting the children and their families in accessing mainstream services at the earliest possible stage (Case, 2018; Morgan and Newburn, 2007).

One of the New Labour’s important early intervention schemes was the Sure Start initiative. The aim of the programme was to “support young children and their families by integrating early education, childcare, healthcare, and family support services in disadvantaged areas” (Crawford and Evans, 2017, p.810). It planned to break the intergenerational transmission of poverty, school failure, social exclusion, and offending by delivering wide social, educational, and developmental benefits. For example, Sure Start Children’s Centres are places “where children under five years old and their families can receive integrated services and information, and where they can access help from multi-disciplinary teams of professionals” (Morgan, 2007).

However, owing to the budget cuts since 2010, Sure Start has been limited to targeting only ‘the neediest families’ through early intervention (HM Government, 2010). The national evaluation of Sure Start Children’s Centres held between 2009 and 2015 revealed concerns about the impact of budget cuts. It concluded that the benefits of Children’s Centres that aimed to provide supports to parents of young children by improving the mental health of mothers and family functions were being threatened by large budget cuts (Torjesen, 2016).

Through these early intervention/prevention approaches, New Labour attempted to address both the individual and social level causes of youth offending (Bateman, 2016). However, youth justice practice during this period primarily focused on young people who were either in the YJS or at risk of entering it, and thus individualised crime prevention was prioritised over socio-structural intervention (Smith, 2014b). For example, the individual level causes of youth offending were recognised by a number of early intervention initiatives focusing on children and young people identified as at risk of offending (individualised crime prevention) and specific social groups and local neighbourhoods identified as being at high risk of offending (targeted crime prevention). However, social (socio-structural) causes that could have been addressed by universal programmes have not been dealt with seriously by the recent governments. These programmes tackle “the manifestations of social exclusion and

disadvantage (often packaged as generalised or universal crime prevention)” (Case, 2018, p.201); programmes generally located outside of the YJS and made focus on fields including educational improvement, youth provision, family tax credits and neighbourhood development.

The risk-focused strategies and prevention agenda of New Labour were also adopted by the following governments. For example, the Troubled Families programme was initiated by the Coalition in 2012 which was influenced by early intervention approach of the previous government that made focus on at risk families. This programme, which was hugely influenced by the antisocial behaviour and respect agendas, was launched only in England in the aftermath of the 2011 ‘riots’ (see section 2.2). The Troubled Families programme was developed to ‘turn around’ the 12,000 most ‘troubled families’ in England by 2015. The families that were officially targeted by the programme were those that met three of the following criteria: “are involved in youth crime and antisocial behaviour; have children who are not in school; have an adult on out of work benefits; or cause high costs to the public purse” (Department for Communities and Local Government, 2015, p.3). Despite local authority cuts in the following years, the government claimed that the programme had a ‘success rate’ of 98.9 per cent. However, this claim of success needs to be considered with caution since success is difficult to define and measure. Moreover, information regarding the effectiveness of the programme was only gathered from local authorities that had received funding for the programme and that were under pressure to comply with the fixed time schedule. Nonetheless, the second stage of the Troubled Families programme was launched in 2015, and it planned to further support up to 40,000 families by 2020 (Crawford and Evans, 2017).

Most of the early prevention schemes introduced above were launched by New Labour and then adopted by the following governments, and many are still in progress. They were adopted by most local YOTs, primarily in their most deprived neighbourhoods or schools. However, these initiatives also aroused controversy on the grounds that they extended the criminal justice orbit and risk stigmatising environments by targeting and responsabilising young people and their families (Morgan and Newburn, 2007). For example, one of the ethical concerns about the early prevention programmes was that young people and children should not be stigmatised as future offenders, whether they go on to become offenders or not (Crawford and Evans, 2017). As these programmes in general focused on risk factors and targeted young people and families at risk, they labelled young people as possible delinquents of the future, which in itself could increase criminalisation (Lewis et al., 2016). Consequently, these risk-based approaches became part of the cause itself, both directly and indirectly. McAra and McVie (2007) demonstrated that formal contact with young people with high risks could lead to more and more severe police contact. These risk-based policy and practice became main

approaches of the government, which resulted in so-called effective evidence-based practices and what works response to it in UK (Case and Haines, 2009).

Youth policy and practice since the mid-2010s has appeared to experience a less punitive children-first approach as it has tentatively moved away from the previous risk factor prevention paradigm. For example, the Scaled Approach to youth practice, which used risk-based assessment and interventions, was abolished, as it received increased criticism from policy makers, academics and practitioners (Youth Justice Board, 2014). The assessment tool, Asset Plus replaced the original Asset framework; it is claimed to be less risk-oriented than the original scale, and “builds in more scope for practitioners to assess foundations for change, desistance mechanisms, strengths, the voices/perspectives of children and to utilise their professional discretion” (Case and Haines, 2018, p.2). However, as Case and Haines (2018) argue, there has not been a clear alternative policy to replace the risk-based approach to youth justice and to inform and shape post-risk practice. As a result, the majority of YOTs have returned to risk-focused and offence- and offender-based approaches instead of more rights-facing or child-focused intervention and prevention approaches (Hampson, 2018).

In recent years more autonomy was given to local authorities when the Coalition Government removed a number of the mechanisms for standardised youth justice practice. The absence of a clear central narrative on youth justice and practice increased variations between local authorities in the development and delivery of youth services and programmes. For example, the practice trends can be found in sections 133-8 of The Legal Aid, Sentencing and Punishment of Offenders Act 2012, which state the conditions for out-of-court disposals, however, no clear details on the intervention requirements are included (Kelly and Armitage, 2015). As Taylor (2016) has also recommended from his review of the Youth Justice System in England and Wales, the devolution of youth justice practice to local government could bring a positive impact, since the circumstances surrounding every local area are different and therefore require a unique approach. However, the recent localism in delivering youth practice aimed more to formally transfer powers and responsibilities to local authorities, communities and individuals (Davies, 2019). Now local authorities have more freedom in delivering youth services but they also need to deal with the significantly reduced budgets resulting from austerity. Although an increased number of local authority youth services have suffered from youth service cuts, such as the closure of a large number of youth centres, the government has taken a hands-off response towards these problems faced by the local governments (Davies, 2019).

Indeed, since the Coalition government came to power in 2010, ‘austerity’ measures reshaped all youth policies and practices. The new government aimed to reduce “an unacceptably high

budget deficit” (Davies, 2019, p.67). The large cut down in the funding for local authority services implemented immediately and had a crucial influence on youth services in general and also on local youth services in specific. The effects of nationwide cuts on youth services caused the redundancy of qualified youth workers and a rise in unqualified volunteer roles and in many cases led to the closure of a variety of youth work facilities (Mason, 2015). More specifically, a £422.3m reduction was made to youth services for young people between 2013 and 2018; 3,500 jobs in youth services have been lost, 600 youth centres have been shut down, and 130,000 jobs in youth centres have been lost since 2010 (Brown, 2019). Furthermore, fewer and fewer school officers are available to mentor young people on issues of antisocial behaviour and home safety (Youdell and McGimpsey, 2015) and some local antisocial behaviour teams have been disbanded, downsized, or integrated into other departments (Ojo et al., 2017).

These budgetary pressures have made local authorities revert to the approach of the previous government, which limited interventions on children to the most deprived and the vulnerable (NYA, 2014; Davies, 2019). Specifically, most local authorities have pointed out that, considering the dramatic budget cut they had faced, they have had to prioritise their primary roles in terms of child protection. For example, qualified youth workers have been playing roles as social care supporters where the main focus is on the at high risk and the vulnerable. Moreover, youth workers have started to have more generic staff roles rather than to practise specialised roles as youth workers or youth social workers (Puffett, 2012).

In summary, the current youth justice programmes are largely influenced by the New Labour government’s risk-based approach, which focused on early intervention and prevention schemes. There have been some attempts to adopt more child-friendly programmes and to allow more autonomy for local authorities to adopt best fitting services for their own area by the Coalition and the following Conservative governments. However, the absence of clear details on youth services, combined with the budget cuts resulting from economic austerity, have made local authorities return to a risk-based approach that targets young people and their families and responsabilises young people, their families and their local areas. Moreover, there have been some localised approaches in delivering youth programmes, but the focus is more on recognising the most deprived neighbourhoods in order to target them rather than making efforts to improve the universal material conditions of deprived neighbourhoods in order to reduce social inequalities.

2.5. Conclusion: After 30 years, ongoing issue of antisocial behaviour

The specific discourses on youth crime discussed in this chapter demonstrate that antisocial behaviour among young people has been an ongoing social concern, from the behaviour of 'gangs of hooligans' in the late 19th and early 20th century, to the violent and unruly behaviours of the so-called 'Teddy Boys', 'Mods' and 'Skinheads' and working class youths in the post-war period, the young people rioting on the street in the 1980s, the antisocial behaviour among young people in the 1990s and the youth knife crime and gang violence more recently. However, borrowing Hendrick's (2015, p.14-15) expression, "there is nothing new about debates concerning young people's behaviour" at least, there wasn't until the 1980s, when neo-liberalism took place and budgets became another issue in deciding how to react to youth crime. Reforms from the 1990s started to be derived more from a power and control framework (Muncie, 2009). However, regardless of the recent changes in the responses towards youth offending, how society creates and reacts to youth offending "ultimately tells us more about social order, the state and political decision-making than it does about the nature of young offending and the most effective way to respond to it" (Muncie, 2004, p.303).

Indeed, the antisocial behaviour agenda of the 1990s that was recreated by New Labour also reflects how issues surrounding young people are used in political decision-making processes. In addition, it shows that the discourses surrounding the causes of antisocial behaviour have not changed much over time, with New Labour's approach reflecting the underclass discourses¹⁹ of the early and mid-20th century, which focused heavily on the responsibilities of young people and their family. For example, one of the main laws made by the New Labour government, the Crime and Disorder Act 1998, broadened the criminal responsibility of young offenders, by abolishing *doli incapax*, which led to a shift from a more child-focused approach to considering children as fully responsible for their behaviours. At the same time, the Act tried to hold parents responsible for the behaviours of their children, a tendency that continued as the Coalition Government also stated the importance of parents' responsibility in dealing with antisocial behaviour (Ministry of Justice, 2010). More recently, the Conservative government adopted a 'public health' approach in dealing with youth knife and violent crime that considers knife crime as an individual disorder or disease, which needs to be dealt with using medical treatment (Case and Haines, 2019).

Despite the main approach to tackling antisocial behaviour being primarily focused on the problematic individuals and their families, there have been some attempts to understand and

¹⁹ See section 2.1 for more information on 'underclass discourse'.

deal with antisocial behaviour in a broader context. For example, in dealing with antisocial behaviour, New Labour also adopted a localised approach²⁰ and launched a set of Area-Based Initiatives. New Labour's localised approach, however, was often used to generalise the perpetrator groups by area, which made it easier for the government to control young people's behaviour. For example, polarisation between young people from advantaged and disadvantaged areas allows political and social justifications for interventions (Lupton, 2003). Most of the area-based Initiatives of the New Labour government considered the residents as the victims and the young offenders as the perpetrators. The focus was more on the harm the young perpetrators were causing to their neighbourhoods rather than addressing further the effects of the neighbourhood on young people. The approaches did not reflect the effects of neighbourhood structural conditions such as deprivation, crime rate and racial heterogeneity on young people. They also did not reflect the effects of neighbourhood perceptions, including mutual trust among residents and social control, for example, whether residents were willing to get involved in the common good in their community. Despite considerable central government investment, this localised policy and practice in general was criticised for its punitive approach to young people (Skinns, 2005) and for its approach in tackling the additional problems of deprived neighbourhoods, mainly through additional, targeted, specific and time-limited approaches (Lupton and Power, 2005). More recently, the Coalition and Conservative governments have focused on the importance of partnership with local authorities in tackling antisocial behaviour and have introduced localism in delivering youth services to reduce antisocial behaviour, reflecting the unique conditions of specific local area (discussed earlier in this chapter). However, this localised approach has been used more to responsabilise local authorities and young people (Jupp, 2020), rather than aimed to have an impact on reducing antisocial behaviour or knife and violent crime.

As gangs of hooligans were a concerning issue in the early 20th century, now antisocial behaviour and, more recently, youth knife and violent crime have become a threatening issue for society. A number of different laws enacted during recent decades show the efforts that have been made by the government to tackle antisocial behaviour. Overall, the approaches used by the recent governments have taken a punitive risk factor approach, which focuses mainly on controlling young offenders, while discussions on the research evidence about the wider influences on antisocial behaviour have been broadly missing. This risk factor approach concludes that the main causes of antisocial behaviour are personal characteristics and poor parenting in deprived families that is mainly linked with personal failures and flaws. This

²⁰ See section 2.3 for more information on New Labour's localised approach.

approach is criticised as it makes heavy focus on individualised causes of – and thus remedies to – antisocial behaviour (Johns et al., 2017).

Even though it was not well adopted in the policy making process in the UK, there is a body of studies that stress the joint contributions of individual, family, social, and contextual features in deriving antisocial behaviour among young people (Anderson et al., 2015). In the next chapter, empirical studies on antisocial behaviour at the individual, family and neighbourhood level are introduced, which will eventually lead us to identify the importance of understanding antisocial behaviour as a set of interconnected influences among different factors from different levels including individual, family and neighbourhood.

Chapter 3. Empirical evidence of predictors of antisocial behaviour among young people

In this chapter, empirical evidence on the individual, family and social predictors of antisocial behaviour among young people is reviewed. In addressing the predictors of antisocial behaviour, not many studies have included comprehensive coverage of individual and family and area level factors (Wikstrom and Loeber, 2000). However, identifying the determinants of antisocial behaviour among young people by looking solely at individual and family level factors only gives a limited understanding, since it has been shown that children's development is also influenced by neighbourhood factors (Ingoldsby and Shaw, 2002). Some previous researchers have highlighted the absence of a discussion on area level effects on antisocial behaviour. Wikstrom and Loeber (2000) noted that "*our current state of knowledge of the interaction of community and individual factors in producing offending behaviour is therefore very limited*" (Wikström and Loeber, 2000, p.1110). Elliott et al. (1996) argued that the theoretical as well as empirical discussions of neighbourhood effects are at a basic level. Farrington et al. (1993) suggested that researchers studying neighbourhood effects have generally not successfully addressed individual level effects, just as researchers studying individual level effects have generally not sufficiently addressed area level effects. More recent researchers still argue that few studies have addressed the mechanism underlying the relationship between social disadvantages and antisocial behaviour (Piotrowska et al., 2012) and the addition of area level factors can add considerably to the understanding of youth antisocial/criminal behaviour (Fabio et al., 2012). Therefore, in reviewing existing studies on the predictors of antisocial behaviour, this study investigates individual, family and neighbourhood level effects.

The combined methods of a semi-systematic literature review and forward/backward searching were applied to review empirical evidence on the predictors of youth antisocial behaviour (section 3.1). In the following sections, the individual, family and neighbourhood level determinants of antisocial behaviour are reviewed in that order. Often, the effects of individual and family level factors cannot be rigorously separated. For instance, whether genetic factors should be included at the individual level or at the family level is not clear. Therefore, some individual and family level risk factors are cross-referenced in both the individual and family level sections, whereas on other occasions it was deemed more appropriate to combine the findings within one section.

3.1. Semi-systematic literature review

This chapter provides a semi-systematic literature review on the empirical evidence of the determinants of antisocial behaviour among young people. Since the nature of this study requires the review of a considerable amount of literature on various types of relevant studies (individual, family and neighbourhood effects on young people's antisocial behaviour), a complete systematic review was more than what this study could provide. Thus, the aim of this review chapter is to offer an essential review of the most relevant recent empirical studies rather than providing complete review.

The inclusion criteria for this literature review were that the study was published in English, in a peer-reviewed journal. Published books and book chapters, and articles that used empirical research or meta-analysis in addressing the determinants of antisocial behaviour among young people with a publication date from 1990 onwards were also considered.²¹ In addition, the population of interest was limited to young people in western countries, which were considered to have a similar culture to the UK. Google Scholar and Web of Science were searched for relevant literature and the reference lists of relevant research were also reviewed. In addition, a forward and backward reference search was used to expand the knowledge. A diversity of terms used by different disciplines were included in the search strategy to ensure that all relevant research on the determinants of antisocial behaviour was identified, including the key terms regarding antisocial behaviour used by Piotrowska et al. (2012). Piotrowska et al (2012) completed an extensive systematic review on social gradients in child and youth antisocial behaviour and reported the detailed key search terms and process used in the research. Search terms such as antisocial behaviour, juvenile delinquency, risky behaviour, and offending were cross-referenced with determinants, predictors, and risk factors among young people. After the initial selection process, the abstract of each study was checked to ensure the study was relevant. Studies were excluded if they made focus only on a specific type of antisocial behaviour, for example, determinants of alcohol use or drug use rather than looking for the determinants of antisocial behaviour or juvenile delinquency as a whole. Studies that only focused on severe forms of offending behaviour, for instance murder or robbery, or that only used an adult-sample that did not concern adolescents were also excluded, since this study focuses on antisocial behaviour among young people.

Using these criteria, the literature search retrieved five meta-analysis studies on individual and family level studies, two systematic reviews on individual and family level studies, two

²¹ This study considered studies on antisocial behaviour among young people since the 1990s when the academic and political debate and public concerns about the apparent antisocial behaviour among young people increased considerably in England and Wales.

systematic reviews on neighbourhood level studies, 96 individual studies on individual and family level effects, and 37 individual studies on neighbourhood level effects. The individual and family level factors that were frequently explored by the studies reviewed were: genetic and psychological effects; gender differences; household income; parenting style; family structure; and peer effects (explained further in section 3.5). The neighbourhood level factors that were frequently explored by the studies reviewed were: neighbourhood level poverty/disadvantage; unemployment; crime rate; and collective efficacy. The countries that were most prominent in the evidence were the US and the UK. Some studies also used samples from Australia, Belgium, Italy, Spain, the Netherlands, Norway, and New Zealand but the absolute majority of the previous studies used data obtained from the US. The age group most frequently used for the samples was any age between 10 and 18 but some studies used a sample that included younger children, some as young as 5 years old (e.g., Odgers et al., 2012; Kalff et al., 2001). A variety of statistical methods were used to address individual and family level effects on antisocial behaviour including multiple regressions (e.g., Romero et al., 2001; Deković et al., 2003), confirmatory factor analysis (e.g., Bartusch et al., 1997), latent growth modelling (e.g., Bank et al., 2004), and cross-lagged path models (e.g., D'Amico et al., 2008). The majority of the neighbourhood level studies were conducted using multilevel modelling, but some studies used nested structural equation modelling (e.g., Piotrowska et al., 2019), hierarchical multiple regression (e.g., Eamon, 2002) or negative binomial regression (e.g., Cuervo et al., 2018).

The term antisocial behaviour is one of many terms used in youth behaviour studies, others being juvenile delinquency, risky behaviour, problem behaviour, disruptive behaviour, aggressive behaviour, and criminal behaviour. Often, different study domains have adopted different terms depending on their specific interests or the current policy issue: criminological and legal research often refers to juvenile offending, meaning certain behaviours that involve breaking the law (Wikstrom and Loeber, 2000); the term 'delinquency' is often used by child developmental studies that investigate family effects on the determinants of delinquency (Hoeve et al., 2012; Apel and Kaukinen, 2008); psychological and genetic studies use terms such as 'antisocial behaviour', 'aggression' and 'conduct disorder' and they understand the behaviours as a psychological condition (Martens, 2000; Moffitt and Caspi, 2001; Frick and Dickens, 2006) or genetic symptoms (Moffitt, 2005a; Arseneault et al., 2003; Miles and Carey, 1997) rather than considering these conditions as socially or environmentally influenced behaviours; and, sociological and social policy studies use various terms such as violence (Buka and Earls, 1993), antisocial behaviour (Millie et al., 2005; Smart et al., 2004) and youth offending (Barry, 2007). The terms are often interchangeable in different research domains rather than specific terms always being used in certain research domains. However, caution

should be exercised when comparing the results of different studies. Different studies may adopt different measurements of antisocial behaviour/youth crime even though they use the same or similar terms. Thus, the interpretation of the results should be made considering the research design of each study.

3.2. Individual level effects on antisocial behaviour

Extensive empirical research and theoretical investigation has been carried out to understand the relationship between individual level risk factors and antisocial behaviour. Previous empirical studies on individual level determinants of antisocial behaviours have tried to address the relationship between antisocial behaviour and the following factors: genetic effects; psychological factors such as temperamental dimensions, neuro psychological effects, and low empathy; gender; age; drug, alcohol use; and ethnicity. Some factors such as ethnicity are often used as a factor that shows how the relationship between the independent variable and antisocial behaviour differs depending on ethnicity. Ethnicity is, thus, included in each sub-section when relevant in order to avoid frequent cross-referencing between sub-sections.

3.2.1. Genetic effects

There is a body of evidence that demonstrates that genetic effects are one of the essential risk factors of antisocial behaviour (Rhee and Waldman, 2002; Beaver et al., 2015; Rutter et al., 1998; Carroll et al., 2021; Ruisch et al., 2019; Lubke et al., 2018). The earliest attempts to address genetic effects on antisocial behaviour included studies of the family trees of convicted criminals (see for example, Dugdale, 1910). For example, Goring (1913) asserted that criminal behaviour was inherited to a large extent and was related to mental inferiority. By conducting studies on convicts, he found associations between parents and their children, between siblings, and between the criminality of married couples, but a poor association between poverty and broken homes and crime and concluded that social level factors did not significantly explain criminality. These early studies argued that criminal behaviour was inherited via passed down genes and, therefore, to reduce crime, they suggested prohibiting people with those characteristics from reproducing. This logic was the basis for the development of eugenics, “*a doctrine concerned with improving the genetic selection of the human race*” (Muncie, 2015, p.90). These early studies were not only questioned on ethical grounds, but also criticised for their failure to address the potential impacts of a variety of social conditions (Muncie, 2015; Rutter et al., 1998). Since these studies included only a few or no environmental and social factors, inadequate measures were used for their examinations. Thus, the high association between the criminality of family members can be simply explained

by other factors such as poor parenting, poor schooling, unemployment and other socio-environmental factors that the researchers did not consider (Vold and Bernard, 1986).

Nevertheless, studies in this area have repeatedly documented the connection between antisocial behaviour and genetic factors. In the last few decades, twin and adoptee data have become extensively available (see Beaver et al., 2015; Beaver, 2013; Slutske et al., 2001) and these studies enable us to more effectively separate genetic and environmental effects. For example, a meta-analysis of data from 24 genetic research studies concluded that there was a considerable overall genetic influence that may explain around fifty percent of the variance in aggressive behaviour (Miles and Carey, 1997). Genetic researchers have tried to explain the familial concentration of crime in relation to heritability (Moffitt, 2005a). At the same time, behavioural genetic researchers have studied genetic and environmental effects together in studying criminal behaviour.

Empirical research on 1,116 pairs of 5-year-old twins in England and Wales found an association between genetic risks and antisocial behaviour among young children (Arseneault et al., 2003). According to these findings, being involved in antisocial behaviour was affected by genetic risks (around 80 percent) and experiences that were specific to each child (around 20 percent). The researchers drew the conclusion that genetic factors contribute considerably to population variation in antisocial behaviour among young people, whereas experiences specific to each young people have relatively weak effects on antisocial behaviour among adolescents (Arseneault et al., 2003). Their conclusion is consistent with a taxonomic theory of antisocial development (Moffitt, 1993; DiLalla and Gottesman, 1989), which suggests that early onset antisocial behaviour has its origins in heritable neurodevelopmental weaknesses and is likely to persist over an individual's lifetime. Conversely, adolescent onset antisocial behaviour is relatively temporary and known to be influenced by peer social relationships.

In measuring genetic and environmental effects on antisocial behaviour, Jacobson et al. (2002) used a population-based sample of 6,808 adult twins in the US and obtained retrospective reports of antisocial behaviour during three different developmental periods: prior to age 15 years (childhood), aged 15–17 years (adolescent), and aged 18 years and older (adult). In their findings, which also considered gender differences, genetic factors played a greater role in the variation in antisocial behaviour among young girls aged under 15, whereas shared environmental factors had stronger effects on young boys. They made an assumption in interpreting the result that gender differences in the timing of puberty might explain the earlier occurrence of genetic influences among girls considering that certain genetic influences on antisocial behaviour are first activated at puberty and girls experience puberty earlier, on average, than boys (Crockett and Petersen, 1987; Tanner, 1968).

In her review work, Moffitt (2005b) focused on the interplay between behavioural genetics and environment in understanding antisocial behaviour. She claimed that studies on antisocial behaviour are stuck in the risk factor stage, stating that there has been a failure to understand causal processes of antisocial behaviour. Rather than focusing on the sole effects of genetics on antisocial behaviour, Moffitt (2005b) described the role of genetic factors in evidencing the effects of environmental determinants and the interplay of genetic and environmental factors.

Ruisch et al. (2019) also studied gene-environment ($G \times E$) interactions associated with antisocial behaviour using a sample of 8,941 children from the Avon Longitudinal Study of Parents and Children Study (UK). Using negative binomial regression, they analysed specific genes and environmental adversity (maltreatment and smoking during pregnancy) interactions and found significant $G \times E$ effects on antisocial behaviour.

Carroll et al. (2021) studied continuity and change in the genetic and environmental etiology of youth antisocial behaviour using a sample of 502 U.S twin families (children aged between 3 and 22) from the Twin Study of Behavioural and Emotional Development. By conducting growth curve modelling and a series of univariate and bivariate twin analyses, they revealed that genetic and nonshared environmental effects that exist in the early years have significant effects on stability and change across development. They also showed that even though there is a decreased tendency in terms of the frequency of antisocial behaviour as children grew older, children who are involved in high levels of antisocial behaviour during their early years continue to do so throughout their development.

Lubke et al. (2018) addressed genetic and environmental effects on child aggression using a sample of 42,827 twins (aged between 3 and 16) from the Netherlands Twin Register. After comparing two simplex models to untangle potentially changeable behaviours from alterations in genetic and environmental influence, they revealed that there is considerable stable genetic influence throughout childhood.

Poore and Waldman (2020) investigated the relationship between oxytocin receptor gene (OXTR) and antisocial behaviour using a meta-analysis based on twelve studies (fifteen samples) with a total sample of 12,236 participants. Their random effects models found a significant genetic effect on antisocial behaviour based on six studies (a total sample of 6,278 individuals).

Although there has been some improvement in understanding the effects of genetic factors on antisocial behaviour since the early 20th century (Beaver et al., 2015), the findings regarding genetic effects on antisocial behaviour should be interpreted with caution. Most of all, as Rutter et al. (1998) has mentioned, "there is no gene that is specifically related to antisocial behaviour,

and it is not at all likely that one could ever be found "(p.135). It should be noted that antisocial behaviour is a socially and legally defined concept; it is a multifactorially determined behaviour, which means that the genetic effects raise the likelihood that these predispositions may occur but whether or not they actually result in antisocial behaviour depends on a range of other factors and triggers. Thus, the findings regarding genetic effects need to be interpreted with caution.

3.2.2. Psychological and personality effects

The contribution of psychological and personality characteristics to the development of antisocial and criminal behaviours has been widely accepted by criminologists since the 1990s and the publication of a book, '*A general theory of crime*' by Gottfredson and Hirschi (1990). Their book gave a new impetus in criminology by stating that the psychological characteristics are essential factors in explaining antisocial and criminal behaviour and this has now become a mainstream position in contemporary criminological theory (Cohn and Farrington, 2008; DeLisi, 2011). Since then, psychological predictors of antisocial behaviour such as impulsiveness and poor psychological adjustment have been widely studied by criminologists (Romero et al., 2001; Moffitt et al., 1994).

Schmits and Glowacz (2019) investigated the effects of aggression, impulsivity, empathy, and cognitive distortions on delinquent behaviour, alcohol use and cannabis consumption among adolescents and young adults. A sample of 608 Belgian young people aged between 15 and 25 was used to conduct multiple regression analysis, which revealed significant effects of aggression, impulsivity, empathy, and cognitive distortions on delinquency among young people. Their moderation analysis result revealed that certain relationships were stronger among adolescents, whereas others were stronger among young adults.

Álvarez-García et al. (2019) tested the mediation effects of impulsivity and empathy in addressing the relationship between family and friends and adolescent antisocial behaviour using a sample of 3,199 adolescents (aged between 11 and 18 in Asturias (Spain)). Their structural equation analysis result revealed that there were some direct effects of family and friends on adolescent antisocial behaviour but most of the relationship was indirect and was mediated by low empathy and impulsivity.

Longitudinal research on several hundred New Zealand males aged 13 to 18 showed the association between neuropsychological status and delinquency (Moffitt et al., 1994). In this research, neuropsychological status consisted of five different factors that measured mental ability, including verbal function, visual-spatial function, memory function, motor skills and mental flexibility. Moffitt et al. (1994) concluded that a poor neuropsychological condition,

especially poor verbal ability, was related specifically to male delinquency that started prior to age 13 and was sustained at high levels thereafter but did not predict delinquency that started in adolescence. Moffitt (1993b) argued that the relationship between poor verbal ability and early onset antisocial behaviour was due to dysfunctional communication between a young child and his/her parents, friends, and teachers, and that this may be one of the strongest risk factors for childhood conduct problems that develop into long-term antisocial behaviour in young adulthood. Moreover, neuropsychological difficulties may hinder school achievement, which is a known risk factor for delinquency (Cernkovich and Giordano, 1992; Wasserman et al., 2003).

In their two-year longitudinal empirical research, Romero et al. (2001) measured the relationship between temperament variables including extraversion, neuroticism, psychoticism, impulsivity and sensation-seeking using the following three subject groups: school-attending male (N=435) and female (N=529) adolescents, and institutionalised delinquent male adolescents (N=95) aged between 14 and 19 in Galicia (north west Spain). The results confirmed that some of the temperament variables, characterised by high sensitivity to reward and/or weak response to punishment signals, predicted antisocial behaviour. In their separate analysis between school attending males and females, the significant predictors that increase antisocial behaviour for girls were impulsivity and extraversion while those for boys were disinhibition, psychoticism, and experience-seeking.

Jolliffe and Farrington's (2007) empirical research on 720 UK adolescents in year 10 (mean age=14.8) measured the relationship between low empathy (assessed by cognitive and affective empathy) and offending. They found that adolescents who had engaged in violent behaviour had lower empathy than those who had not. Adolescents with high-rate offending behaviour had lower empathy than those with low-rate offending behaviour. They concluded that their findings supported descriptions of psychopathology as a combination of psychological and behavioural features connected to an increased rate of violent behaviour (Harpur et al., 1988), which suggest that low empathy might influence continual offending by making 'offenders' eventually immune to the emotional reactions of their victims (Jolliffe and Farrington, 2007).

A variety of psychological characteristics such as neuropsychological difficulties, extraversion, psychoticism, impulsivity, sensation-seeking and low empathy have been used to explain antisocial behaviour among young people. However, the impact of different psychological characteristics on antisocial behaviour has been found to vary in strength, timing and duration. Some psychological effects on antisocial behaviour have been found to be significant for younger children but the effects became insignificant for adolescents (see for example, Moffitt

et al., 1994). Thus, interpretations should be made carefully considering the unique effects of different psychological and personality factors on antisocial behaviour among young people. In addition, to fully understand the psychological and personality determinants of antisocial behaviour, often other family, social and environmental factors need to be considered together.

3.2.3. Gender differences

Researchers have revealed that gender difference is one of the most robust determinants of antisocial behaviour (Moffitt, 2001). In the previous studies on antisocial behaviour, gender differences were often included as one of the demographic control factors rather than as a predictor of antisocial behaviour (for example, Bor et al., 2004) to check whether the relationships between the explanatory variables and a dependent variable (antisocial behaviour) varied depending on gender (for example, Hoeve et al., 2012; Saladino et al., 2020; Cutrín et al., 2018).

Tzoumakis et al. (2020) addressed the gender-specific intergenerational transmission of antisocial behaviour using a sample of 9,1635 children and youths from the New South Wales Child Development Study.²² They tried to find out whether male and female youth offenders were differently affected by offensive behaviour of their parents by conducting a series of logistic regression analyses. Their findings revealed that gender-specific relationships were not greater than relationships across-gender. Greater relationships were found between mothers' and daughters' antisocial behaviour.

Burt et al. (2018) examined the gender differences in the etiology of youths' antisocial behaviour using a sample of 1,030 child twin pairs from the Michigan State University Twin Registry (US). They examined the relationship using an extended univariate $G \times E$ model. In their findings, stronger genetic effects were found among females while stronger environmental effects were found among males, when antisocial behaviour was reported by teachers. They concluded that the etiology of antisocial behaviour varies across gender at least in school contexts.

Gutman et al. (2018) examined the gender specific trajectories of conduct problems using a sample of 6,458 British children aged between 3 and 11 from the UK Millennium Cohort Study. They conducted a series of univariate regression and multinomial logistic regression analyses and found significant precursors of the variant trajectory groups with differences by gender. Early socioeconomic disadvantage was significantly associated with early-onset pathways

²² New South Wales is the most populous state in Australia.

among both genders. The childhood-onset trajectories of males, but not females, were associated with parental attitude and behaviours.

In their multilevel meta-analysis of 74 studies, Hoeve et al. (2012) measured the relationship between poor attachment to parents and delinquency and whether this relationship differs depending on gender. Their findings identified a significant association between poor attachment to parents and delinquency, but gender differences did not change the relationship at a statistically significant level. In addition, stronger relationships (effect sizes) were found when the child had the same gender in comparison to cross-gender pairs of child and parent.

Jacobson et al. (2002) measured gender differences while testing the genetic and environmental effects on antisocial behaviour and found that genetic factors played a greater role in the variation in antisocial behaviour among young girls (see 3.2.1 for more detail). Deković et al. (2004) used a sample of 603 adolescents from four different ethnic groups²³ in measuring the role of family and peer relationships in antisocial behaviour and also included gender effects to see whether the relationship differed depending on gender. Deković et al. (2004) found that high levels of antisocial behaviour were found among male adolescents and involvement with delinquent peers showed decisive effects of gender, with boys being more frequently engaged with friends who also commit higher levels of delinquency (Deković et al., 2004).

Moffitt (2001) undertook a systematic measure of gender differences in relation to antisocial behaviour. Gender differences in regard to three different types of antisocial behaviour – namely, reported antisocial behaviour, official records of antisocial behaviour and frequency of different types of offences – were examined using different methods. From the research, it was concluded that more males than females perpetrate antisocial behaviours, and males are involved in more types of antisocial behaviours than females. The study also confirmed that males engage in more serious persistent antisocial behaviours at a higher rate compared to females. The gender difference was slightly greater in the official records than in the self-reported data. This phenomenon has been found in previous studies and is generally attributed to the relatively higher severity of offences that are officially recorded (Hindelang et al., 1979; Muncie, 2015).

As shown from the studies reviewed here, higher male engagement in antisocial behaviour is a general finding that applies across different cultures and over time (Muncie, 2009; Rutter et al., 1998). However, which factors actually contribute to this gender difference in antisocial behaviour, and also antisocial behaviour among girls, have not been sufficiently addressed

²³ The four ethnic groups were Dutch, Moroccan, Turkish and Surinamese.

(Morizot and Kazemian, 2015). Most criminologists have conventionally made focus on male prisoners, male-perpetrator antisocial behaviour, male juvenile offenders, while the information on antisocial behaviour among females is insufficient (Rutter, 2012). Although several empirical studies have revealed a statistically significant relationship between gender and antisocial behaviour, these findings need to be interpreted with caution as the extent of the gender differences in regard to antisocial behaviour varies by ethnicity, age, and the pattern of antisocial behaviour (Rutter, 1998; Muncie, 2015).

3.2.4. Age

There are two competing hypotheses regarding the effects of age on antisocial behaviour. Developmental theories of antisocial behaviour posit that the contribution of different risk factors to antisocial behaviour varies between different age groups (Moffitt, 1993; 2018), while Gottfredson and Hirschi's (1990) general theory maintains that the risk factors underlying criminal behaviour (for example, criminal disposition) do not change across the life course. To test these conflicting arguments, Bartusch et al. (1997) used longitudinal data from males aged between 5 and 18 in Dunedin (the second-largest city in the South Island of New Zealand). The developmental theory was coherently supported by the estimation result, which used second-order confirmatory factor models of antisocial behaviour, showing that different latent factors underlie childhood and youth antisocial behaviour (see also section 3.2.1). For example, low verbal ability, hyperactivity, and negative/impulsive personality had a stronger relationship with childhood antisocial behaviour compared to youth antisocial behaviour, while peer delinquency had a stronger relationship with youth antisocial behaviour compared to childhood antisocial behaviour.

Some researchers have also addressed the importance of differentiating antisocial behaviour according to its age of onset (Moffitt, 2006; Hyde et al., 2015; Lorber and Slep, 2015; Shaw et al., 2006). Age is often used when understanding the differences between 'life-course-persistent' and 'adolescence-limited' antisocial behaviour. After more than 10 years of research into a developmental taxonomy of antisocial behaviour, Moffitt (2006; 2018) proposed two major hypothetical prototypes: 'life-course-persistent' versus 'adolescence-limited offenders'. Life-course-persistent offenders' antisocial behaviour is mainly influenced by neurodevelopmental processes; it starts in childhood and sustains thereafter, while adolescence-limited offenders' antisocial behaviour is more likely to be influenced by social processes; it starts in adolescence and disappears in early adulthood. Studies have also revealed that 'life-course-persistent offenders' are rare, continuous, and pathological, while 'adolescence-limited offenders' are more prevalent, relatively temporary, and near normative (Moffitt, 1993; Bartusch et al., 1997; Moffitt, 2006; Moffitt and Caspi, 2001). Empirical research

by Aguilar et al. (2000), who used a 20-year longitudinal study (n=180) in a high-risk urban population in Minneapolis (the most populous city in the US state of Minnesota), also supports the presence of an early-onset/persistent group and an adolescence-onset group.

Barker and Maughan (2009) also addressed the differences between adolescents early-onset persistent conduct problems and adolescents with childhood-limited conduct problems using a sample of children aged between 4 and 13 from the Avon Longitudinal Study of Parents and Children (consist of 14,541 pregnancies and 13,971 singletons/twins). Their growth mixture models, and multivariate multinomial logit regression result showed that there is a distinction between early-onset persistent versus childhood-limited conduct problems in adolescents. Barker and Maughan (2009) further revealed that mothers' anxiety (both prenatal and early postpartum) plays an important role in distinguishing adolescents with persistent conduct problems from adolescents with childhood-limited conduct problems.

More recently, Carlisi et al. (2020) examined the relationship between life-course-persistent antisocial behaviour and neurocognitive abnormalities by testing the hypothesis that it is also related to brain structure abnormalities. They used structural MRI data collected at 45 years of age from 672 participants (born between 1972 and 1973) in the Dunedin Study (New Zealand) to address the relationship. The results revealed that among the participants, 12 percent were classified as having life-course-persistent antisocial behaviour, 23 percent had adolescence-limited antisocial behaviour, and 66 percent had low antisocial behaviour.

3.2.5. Alcohol and illegal drug use

Use of illegal drugs and alcohol consumption have been identified as risk factors for antisocial and other problematic behaviours among young people (Rutter, 2012; Rutter et al., 1998; Dahlberg, 1998; Hammerton et al., 2017). These relationships have been tested by a number of empirical studies (e.g., Wagner, 1996; Jaffee et al., 2012; D'Amico et al., 2008; Barnes et al., 2002; Mason et al., 2010; Hammerton et al., 2017). D'Amico et al. (2008) measured the relationship between substance use and delinquency among 449 high-risk youths from the Los Angeles juvenile probation system. His findings indicated that there is a reciprocal relationship between substance use and delinquency. Using large surveys of more than 15,000 secondary school students in the US, Johnston et al. (1993) found associations between illegal drug use and delinquency. Another empirical study by Rossow et al. (1999), who used cross-sectional research with 12,000 Norwegian young people aged between 12 and 20, revealed a statistically significant association between frequency of alcohol intoxication and violent behaviour among young people. Hammerton et al. (2017) examined the effects of excessive alcohol use on antisocial behaviour across adolescence and early adulthood. They used a sample of 13,775 young people aged between 15 and 21 from the

Avon Longitudinal Study of Parents and Children, a population-based birth cohort. By using a parallel growth model, they found that there was a positive association between ASB and excessive alcohol use cross-sectionally and into young adulthood.

However, it is argued that the association between substance use and antisocial behaviour is rather complicated, considering that “*different perspectives produc[e] different predictions about the direction of causality*” (Young et al., 2007, p.204). Some have also argued that the contribution of alcohol and substance use to antisocial behaviour among young people is unclear (Dahlberg, 1998). In his review, Dahlberg (1998) identified a few longitudinal studies that have measured the association between substance use and delinquency but were unsuccessful in finding a clear causal relationship between them (White et al., 1993a; White et al., 1993b; White, 1992; Dembo et al., 1991). For example, a longitudinal study of young American males aged between 12 and 18 failed to evidence a relationship between alcohol use and aggressive behaviour (White et al., 1993a). Another example, which used a sample of 449 youths from the Los Angeles juvenile probation system, also concluded that the relationship between alcohol use and delinquency is spurious rather than causal (Felson et al., 2008). Felson et al. (2008) found a substantial relationship between drinking and sober delinquency, which suggests that there is a spurious relationship between drinking and delinquency. It is assumed that the liability towards one is closely related to the liability towards the other (McGue and Iacono, 2005).

3.2.6. Peer influence

Peer influence has been considered to be one of the important predictors of antisocial behaviour or delinquency among young people (Wasserman et al., 2003; Rutter et al., 1998). Studies on the relationship between antisocial behaviour and peer influence have concentrated on the influence of deviant/violent peer groups (Jaffee et al., 2012; Henry et al., 2001), peer pressure (Eamon, 2002; Steinberg, 2000), and peer rejection (Wasserman et al., 2003). There are also some studies that have investigated the mediation effects of peer effects on antisocial behaviour (Cutrín et al., 2018).

Steinberg (2000) completed a review of the research on youth violence and argued that a noticeable difference between the violent behaviour of young people versus that of adults is that young people have a tendency to offend in groups, together with their peers. It is not that peers inherently have a negative influence on adolescents' behaviour, but that a considerable percentage of delinquent acts perpetrated by teenagers are done in groups. Many young people will engage in reckless, risky, dangerous, or illegal behaviours when accompanied by other young people, which they would not do on their own. In another review study on the determinants of antisocial behaviour, Jaffee et al. (2012) examined peer effects, exploring

whether delinquent peers model and encourage antisocial behaviour or adolescents selectively get along with delinquent peers. Their extensive review of longitudinal, epidemiological, and genetic studies suggested that there is substantial evidence that both social selection of delinquent peers and social causation are influential in the relationship between peer delinquency and antisocial behaviour. Although adolescents who participate in antisocial behaviour consciously get along with deviant peers, associating with delinquent peers gives them new opportunities to perpetrate antisocial behaviour.

Eamon (2002) studied peer, parenting, poverty, and neighbourhood influences on youth antisocial behaviour using a sample of 963 adolescents aged between 10 and 12 from the National Longitudinal Survey of Youth (US).²⁴ In this study, peer pressure was measured by adolescents reporting whether they felt pressure from their peers to smoke cigarettes, try marijuana or other drugs, drink alcohol, try truancy, and engage in illegal behaviours or participate in violence. Their findings suggested that peer pressure significantly predicts antisocial behaviour among adolescents.

In studying peer group and parenting effects on delinquency, Henry (2001) divided delinquency into nonviolent and violent delinquency and also divided peer effects into peer delinquency and peer violence. Using a Chicago sample of 246 male adolescents, Henry (2001) found that there was a significant relationship between peer violence and future individual violent and nonviolent delinquency but that there was no significant relationship between nonviolent delinquency of peers and either future individual violent or nonviolent delinquency. The results suggest that peer delinquency, especially violent delinquency, should be taken more seriously, since it appeared to be more influential than nonviolent delinquency regarding both nonviolent and violent delinquency among young people. There was a variation in the relationship when ethnicity was included in the model. Peer violence has significant effects on individual violence for Hispanic but not for African American adolescents.

Cutrín et al. (2018) addressed the mediation effect of deviant peers in examining the relationship between parenting and antisocial behaviour and substance use using a sample of 663 adolescents aged between 12 and 15 living in Galicia (Spain). They used structural equation models to test the relationship and concluded that there were significant mediation effects of deviant peer affiliations on the relationship between parental knowledge and antisocial behaviour and substance use.

²⁴ Please refer to section 3.3.1 for more information on parenting effects and 3.4 for neighbourhood effects on antisocial behaviour.

3.2.7. Summary of individual level effects on antisocial behaviour

This section reviewed empirical studies that addressed the relationship between antisocial behaviour and individual level risk factors – namely genetic effects, psychological and personality effects, gender effects, age effects, substance use and peer influence. Not all of the studies were successful in finding a clear relationship between their individual level predictor variables and antisocial behaviour. For example, some studies were not able to find a statistically significant relationship between substance use and antisocial behaviour. Even though some studies confirmed a relationship between substance use and antisocial behaviour (Johnson, 2015; Rossow et al., 1999), other studies concluded that the relationship was reciprocal (D'Amico et al., 2008), spurious (Felson et al., 2008), or unclear (White et al., 1993a).

Some studies have focused solely on the influence of one type of factor. For example, Miles and Carey (1997) conducted a meta-analysis of data from 24 genetic research studies and concluded that genetic influence may explain approximately half of the variance in aggression. On the other hand, other studies have tried to unpick these complicated relationships in addressing the determinants of antisocial behaviour. For example, in measuring the association between poor attachment to parents and delinquency, Hovee et al. (2012) also considered gender effects and tested whether the relationship varied depending on gender.

These empirical studies have shown that there are individual characteristics that have significant effects on antisocial behaviour. However, they vary depending on different circumstances and by antisocial sub-type as well as being influenced by wider social and environmental factors. For example, the complicated relationship between individual level factors and antisocial behaviour could be explained by looking at the example of genetic effects on antisocial behaviour. Genetic effects operate more strongly in early childhood, but they get weaker as later antisocial behaviour is influenced more by the social and wider environment. Rather than causing antisocial behaviour directly, genetic factors as well as psychological factors constitute a set of impacts that work in a probabilistic fashion as part of multifactorial causation (Rutter et al., 1998). Some individual level factors, including genetic and psychological effects, operate through influences on people's vulnerability to social and environmental difficulties and stressors, and some through their role with respect to behaviours related to the shaping and selecting of environments (Rutter et al., 1998). Therefore, it should be noted that individual characteristics can explain only a part of antisocial behaviour and need to be integrated with wider family and environmental factors to understand antisocial behaviour comprehensively.

3.3. Family level effects on antisocial behaviour

Theoretical and empirical studies have continuously provided the view that there is a link between family environment and antisocial behaviour among young people and children (Pardini et al., 2015; Saladino et al., 2020). A substantial body of empirical studies has identified family level risk factors such as antisocial/criminal parents, poor monitoring and supervision, harsh/inconsistent discipline, parental separation, abuse, neglect and poverty as important predictors of antisocial and related behaviour (Dahlberg, 1998; Wasserman et al., 2003; Rutter et al., 1998; Eamon, 2002; McAtamney and Morgan, 2009; Saladino et al., 2020; Childs et al., 2022; Mazza et al., 2017; Ruiz-Ortiz et al., 2017; Cutrín et al., 2018). This section offers a brief overview of studies that have tried to reveal the association between family structure and characteristics and the development of antisocial behaviour among young people. It concludes by outlining some persisting controversies and remaining questions to be answered.

3.3.1. Parenting style

A number of studies has revealed that parenting styles that are characterised by inconsistent, coercive or physical discipline, low levels of parent-child emotional interaction, low levels of emotional support, and a lack of proper supervision and an absence of responsive parenting are predictors of antisocial/delinquent behaviour (Henry et al., 2001; Deković et al., 2003; Wasserman et al., 2003; Collishaw et al., 2012; Pettit et al., 1997; Baldry and Farrington, 2000; Ruiz-Ortiz et al., 2017).

Ruiz-Ortiz et al. (2017) studied the effects of maternal and paternal parenting on prosocial and antisocial behaviour among Caucasian children (mean age=7.7 years) from the South of Spain. They conducted multiple hierarchical regression analyses, which revealed significant effects of maternal and paternal hostility on externalising problems in boys and girls. They also found a significant association between maternal inconsistency and externalising problems and paternal overprotection and externalising problems for boys and girls, but maternal coercion was associated with externalising problems only in girls. In their discussion, Ruiz-Ortiz et al. (2017) stated that it is important to consider both the parent's and child's gender in addressing parenting effects on child antisocial behaviour.

Deković et al. (2003) conducted empirical research to explore family effects on antisocial behaviour among adolescents using a sample of 608 Dutch adolescents and their parents. They tested various parent-level factors, including parental responsiveness, parental involvement with the child, parent-child attachment, parental rejection (dissatisfaction with the child), parental depression, competence in parenting, family relationships, marital satisfaction,

socioeconomic status, and family composition. Among the above predictors of antisocial behaviour, parental responsiveness, parental involvement with the child and parent-child attachment were found to be protective factors against antisocial behaviour, and parental rejection was a risk factor, even after controlling for other covariates. Similar research that considered various parenting factors as predictors of juvenile delinquency was done by Henry et al. (2001) using a Chicago sample of 246 male adolescents, which also included peer group effects as an explanatory variable.²⁵ The findings suggested that parents who adopt a more supportive disciplinary style rather than using punitive strategies, and parents who give consistent guidelines and direction to their child have a lower risk of having their child engage in antisocial behaviour (Deković et al., 2003). Young people who constantly experience hostile and aggressive parenting might adopt this offensive means of interaction with other people (Pettit et al., 1997). In studying the association between parenting and antisocial behaviour using 719 American same-sex sibling pairs, Pike et al. (1996) tested whether negative parenting factors such as punitive, aggressive or coercive parenting still predict antisocial behaviour at a statistically significant level even after controlling for genetic factors. Their analyses revealed that the effect of parenting style on adolescent adjustment (which consisted of youth antisocial behaviour and depressive symptoms) was not strong but was still statistically significant.

An extensive systematic review of 30 longitudinal, cross-sectional and treatment/intervention studies on the association between parenting style and antisocial behaviour and callous-unemotional (CU) traits in youth was conducted by Waller et al. (2013), and the findings also supported the relationship between negative parenting and antisocial behaviour. Their findings suggested that youth with both high level of antisocial behaviour and high level of CU traits tended to experience negative parenting practices such as harsh or coercive parenting, poor monitoring, low parental warmth, and inconsistent discipline. They also revealed that parenting-focused interventions had effects in reducing the levels of antisocial behaviour and CU traits in young people.

Some researchers have considered historical changes in understanding the relationship between antisocial behaviour and parenting styles. Collishaw et al. (2012) compared two national samples of English adolescents aged 16 and 17 years old in 1986 (4,524 adolescents and 7,120 parents) and 2006 (716 adolescents and 734 parents) using identical questionnaire evaluations in order to find out whether the effects on conduct problems of different parenting styles (parental monitoring, expectation, parental interest and parent-child quality time) vary across generations. The gaps between affluent and disadvantaged families in regard to

²⁵ Please refer to section 3.2.6 for peer effects on delinquency.

parenting differences decreased during the period.²⁶ However Collishaw et al. (2012) concluded that the rise in youth conduct problems could not be explained by the observed change in parental style.

Sampson (1994) measured the mediation effect of parental style on the relationship between family poverty and delinquency using a sample of 1,000 male adolescents (500 officially recorded delinquents and 500 non-delinquents) aged between 10 and 17 living in Boston. The results from a multilevel logistic regression and structural equation modelling indicated that family level informal social control and negative parenting styles, such as threatening and harsh discipline, lack of supervision, and weak parent-child attachment, mediated the effects of family level deprivation on delinquency. The findings suggested that family deprivation hinders family processes of informal social control, in turn raising the likelihood of antisocial behaviour. Strohschein and Gauthier (2018) also measured the mediation effect of parenting on the relationship between poverty and child antisocial behaviour and anxiety/depression using a sample of 1,901 children aged between 8 and 11 from the Canadian National Longitudinal Survey of Children and Youth. Their Poisson regression analysis result revealed that both positive parenting and consistent parenting predict antisocial behaviour at a statistically significant level but there was no significant parenting mediation effect on the relationship between poverty and antisocial behaviour and anxiety/depression.

3.3.2. Low Socioeconomic Status/poverty/low income

Family economic hardship, namely poverty and low income status, have been studied in relation to predicting antisocial behaviour among young people (Dubow and Ippolito, 1994; Chung, 2003; Huaqing Qi and Kaiser, 2003; Piotrowska et al., 2015; McLeod et al., 1994; Strohschein and Gauthier, 2018; Berti and Pivetti, 2019; Mazza et al., 2017). Piotrowska et al. (2015) conducted an extensive meta-analysis of 132 empirical studies that tested the association between socioeconomic status and antisocial behaviour. Their global meta-analysis indicated that lower family socioeconomic status is linked with higher level of antisocial behaviour.²⁷ Furthermore, their moderation analyses indicated that this association was more robust when antisocial behaviour was not self-reported, for example when it was reported by parents or teachers. One explanation for this difference could be that the difference was caused by an 'expectancy effect', whereby both parents and teachers

²⁶ Depending on their composite rating of family SES (measured with parental education, parental employment, housing tenure and financial hardship) families were divided into four categories – namely very advantaged, advantaged, intermediate and disadvantaged.

²⁷ They included studies that measured socioeconomic status with the following factors: employment status, educational indicators, family income and other income-based measures (e.g., income-to-needs ratio, benefit allowance, and free lunch).

considered adolescents from poor families to be more likely to engage in antisocial behaviour (Piotrowska et al., 2015). However, the relationship between antisocial behaviour and family socioeconomic status did not depend on higher-level constructs, namely national income inequality. These results suggest that socioeconomic status can be considered a strong correlate of antisocial behaviour but the solidity of this association may be dependent on the antisocial subtype under research and the design of the study.

Some studies have considered timing/duration of poverty as an important factor in addressing the relationship between poverty and antisocial behaviour. For example, Mazza et al. (2017) addressed the different effects of the timing of poverty between birth and late childhood on behaviour problems in early adolescence using a sample of 2,120 Canadian children at age 13 from the Quebec Longitudinal Study of Child Development. In their study, poverty was categorised into three time periods: between 0-3 years, 5-7 years, and 8-12 years. Their analysis result using partial F-tests revealed that poverty experienced in the early years (aged between 0 and 3) was significantly associated with physical aggression among adolescents. Mazza et al. (2017) concluded that early and long-term poverty is significantly associated with behavioural problems in adolescence. Dubow and Ippolito (1994) tested the effects of poverty on changes in antisocial behaviour among 473 primary school-age children. Their findings revealed that prior poverty status (number of years in poverty between 1982 and 1985) was related to increases in antisocial behaviour (between 1986 and 1990), while the number of years in poverty between the 1986 evaluation and the 1990 evaluation did not predict changes in antisocial behaviour at a statistically significant level over and above prior poverty status. Strohschein and Gauthier (2018) examined the association between depth of current poverty and poverty duration and child antisocial behaviour and anxiety/depression using a sample of 1,901 children aged between 8 and 11 from the Canadian National Longitudinal Survey of Children and Youth. By conducting a Poisson regression analysis, they found a significant association between persistent poverty and child antisocial behaviour.

There have been a body of studies that have measured the mediation effects of parenting between family level economic hardship and antisocial behaviour among young people (Brody et al., 1994; Conger et al., 1994). The findings of these studies suggest that family poverty causes economic pressure and/or daily stresses, which eventually lead to parental psychological distress. Parental distress, in turn, damages children's adjustment by hindering desirable and positive parenting practices and by causing conflict between a parent and a child (Eamon, 2002). McLeod et al. (1994)'s research also measured the mediating effects of parenting such as parental distress and unsupportive parenting in assessing the relationship

between poverty²⁸, single parenthood and antisocial behaviour among children, and further tested whether the relationship varies depending on ethnicity, using the 1988 Children of the National Longitudinal Survey of Youth dataset. They found that there was a stronger relationship between the persistence of poverty and antisocial behaviour among white children, whereas the relationship was weaker between current poverty and antisocial behaviour. The effects of poverty on antisocial behaviour among black children, however, were not statistically significant.

3.3.3. Non-traditional family structure

Certain types of family structure, namely homes with parental separation, single-parenthood and blended households, have long been regarded as risk factors for antisocial behaviour (Apel and Kaukinen, 2008; Anderson, 2002; Henry et al., 1993; Wells and Rankin, 1991; Rutter et al., 1998; McKnight and Loper, 2002; Saladino et al., 2020; Childs et al., 2022; Kaukinen and Apel, 2017). The previous studies suggest that considering some diverse family situations such as parental separation and blended households that are distinct from the traditional, stable, two-parent biological family is essential in studying antisocial behaviour or juvenile delinquency.

An empirical study conducted by Apel and Kaukinen (2008) showed the effects of different types of family structure on antisocial behaviour among adolescents in the US by using a nationally representative sample of 8,330 adolescents from the National Longitudinal Survey of Youth 1997. They found significant differences in the risk of antisocial and delinquent behaviour among groups of adolescents who lived in what are traditionally categorised as intact, (two-biological-parent) and non-intact families. Their findings revealed that adolescents in intact families demonstrated lower levels of antisocial behaviour, which is consistent with the findings of previous studies on the relationship between family structure and antisocial behaviour (see for example, Flewelling and Bauman, 1990; Kierkus and Baer, 2002). Kaukinen and Apel (2017) studied the association between family structure and deviant and antisocial behaviour using a sample of 5,419 US adolescents aged between 12 and 14. They conducted multivariate regression analyses, which revealed that there was greater antisocial and deviant behaviour among adolescents from families where one of the parents had a child from a previous relationship and where the parents were currently married but were cohabiting when their first child was born. Apel and Kaukinen (2008) also found that adolescents in intact families are distinct in critical ways depending on “*whether the two biological parents are*

²⁸ The poverty variable was created by making comparisons between each participant's family income for the previous calendar year reported by mothers and the US. Department of Health and Human Services poverty levels.

married or cohabiting and on whether they have children from a previous relationship" (Apel and Kaukinen, 2008, p.35). Children were more likely to engage in antisocial behaviour when they had stepsiblings and when the parents were cohabiting and not married. Moreover, adolescents who lived with a single biological parent and with a nonbiological partner showed a distinctly higher rate of antisocial behaviour, especially if the custodial parent was the biological father. Cohabiting relationships are more likely to be insecure and lived relatively shorter period compared to marital relationships, and this condition may influence young people who live in and exit from these insecure and unstable family circumstances (Manning et al., 2004).

The relationship between single parenthood and delinquent behaviour is supported by Anderson (2002), who empirically tested the effects of single parenthood on three different types of delinquency with a sample of 4,671 adolescents aged between 13 and 15 in the US. The findings of the study indicated that young people residing in a single-parent household had a greater risk of getting involved in status, property, and inter-personal delinquency than young people residing with both parents. This result is consistent with previous studies that revealed the effects of single parenthood on delinquency among young people (Amato and Keith, 1991). Saladino et al. (2020) also examined the relationship between family structure (intact vs. single parent) and deviant behaviour among Italian adolescents aged between 13 and 19 (n=2,328). They conducted structure equation modelling and found direct and indirect effects of family structure on adolescent deviant behaviour.

Some researchers have tried to understand the reasons behind this relationship and have explained it with lower income or higher residential mobility (Astone and McLanahan, 1991). According to Gelles (1989), the majority of single parent households are headed by women and nearly half of all single mother families experience poverty. Other studies also support the relationship between single parenthood and poverty (Gillham et al., 1998; Walker et al., 2008). Scanlon and Devine (2001) addressed the connection between single parenthood and residential mobility and Astone and McLanahan (1994) also argued that single parent households are more likely to move during the school year than two-parent households. Vernberg (1990) explained the strong effects of residential mobility on young people, which include social distress, difficulty in making friends, and a lack of social support. In addition, previous criminological studies have argued that one parent families have more difficulties in caring for, supervising, and socialising children than two parent families (Amato and Keith, 1991; McLanahan and Sandefur, 1994). In general, both parents are deemed important, and it is argued that the absence of one weakens family functioning.

3.3.4. Sibling effects

On top of parental effects, some sibling effects, namely sibling conflict, negative sibling interaction and sibling collusion, have been suggested to be essential predictors of antisocial behaviour among young people (Bank et al., 2004; Bank et al., 1996; Bullock and Dishion, 2002; Walters, 2018). Walters (2018) addressed the effects of sibling delinquency on future offending using a sample of 215 male adolescents aged between 9 and 17 from the Oregon Screening of Youth at Risk for Delinquency (US). By conducting multiple regression analyses, he revealed the significant association between sibling delinquency and future offending.

A longitudinal study by Bank et al. (2004) tested the effects of sibling conflict and ineffective parenting (in children aged between 10 and 12) on antisocial behaviour among adolescent boys (over the subsequent 5 years) using 182 boys who had siblings, from the Oregon Youth Study. The result of the confirmatory factor analysis and latent growth modelling analysis supported the hypotheses that sibling conflict and ineffective parenting formed distinct constructs rather than a single negative family process construct, and that previous sibling conflict and ineffective parenting, and their interaction, explained boys' concurrent status and developmental trajectories in terms of antisocial behaviour. Another study that used the Oregon Youth Study also supported sibling effects on later antisocial behaviour. In this study, conflicts between siblings predicted later antisocial behaviour (Bank et al., 1996).

Bullock and Dishion (2002) studied the effects of sibling collusion on problem behaviour in early adolescence using macro ratings of videotaped interactions of 52 urban youths aged between 11 and 13 and their families.²⁹ Sibling collusion is “a process by which siblings form coalitions that promote deviance and undermine parenting” (Bullock and Dishion, 2002, p.143). Problem behaviour was explained by sibling collusion even when involvement with deviant peers was controlled. In addition, relatively higher rates of collusion were found among siblings in families with a high-risk target child in comparison to those in families with a normative target child.³⁰

3.3.5. Antisocial/criminal family members

It has been argued by previous studies that parents who have a history of offending behaviour are more likely to have children who commit delinquent behaviour (Lipsey and Derzon, 1998). They undertook an extensive review, which identified the key risk factors for delinquent

²⁹ The sample used by Bullock and Dishion (2002) is a sub-sample of the larger Project Alliance Study which included 257 families.

³⁰ A normative group refers to adolescents who are well adapted within the school context while a high-risk group refers to adolescents with the top 50 risk scores from each school, and adolescents who scored 3.0 or greater on the smoking questions (Bullock and Dishion, 2002).

behaviour and conduct disorder from longitudinal studies on young people. Murray and Farrington (2010) suggested that criminal parents are one of the important risk factors for youth delinquent behaviour and conduct disorder. Some empirical studies have also revealed the effects of antisocial or criminal parent effects on defiant and conduct disorder among young people. Using a sample of 177 mental health clinic-referred children aged between 7 and 13, Frick et al. (1992) found that paternal antisocial personality disorder and paternal substance abuse increase the likelihood of conduct disorder. Loeber et al. (1995), who used the same sample but included only children aged between 7 and 12, also found an effect of parental substance abuse on the onset of child conduct disorder. The Cambridge Study in Delinquent Development, which interviewed 411 males from 397 families and followed them from ages 8 to 32, found that there was a concentration of offending in a small number of families. "While around 60 percent of the families contained at least one convicted person, fewer than six percent of the families accounted for half of all the convictions (Farrington et al., 1996, p.47).

To address the relationship between parental and child criminal behaviour, Besemer et al. (2017) conducted a meta-analysis using 25 publications (including around 3 million children). Their meta-analysis result revealed that there is a significant association between parental and child criminal behaviour. The relationship was greater between mothers and daughters, followed by mothers and sons, fathers and daughters, and fathers and sons.

Farrington et al. (2001) proposed several explanations for the concentration of crime and offending in families and the succession of these behaviours from one generation to the next. Firstly, it could be that intergenerational succession may exist in having various negative life experiences, namely economic hardship, non-intact families and residing in the most deprived areas. Second, assortative mating (the tendency of females with a history of criminal behaviour to get married to, or to cohabit with men with similar experiences) stimulates the intergenerational transmission of delinquency from both a genetic and a learnt behaviour perspective. Third, there may be direct and mutual influences amongst family members (e.g., an adolescent child may imitate certain behaviours of their father). Fourth, the influence of a criminal parent on a child's delinquency may be mediated by other parenting factors including coercive discipline and inconsistent parenting, and fifth, it may be mediated by genetic mechanisms. Finally, intergenerational transmission may reflect police and court bias against known criminal family.

3.3.6. Summary of family level effects on antisocial behaviour

The findings from the above studies suggest that positive parental practices such as supportive parenting, parental responsiveness, parental involvement with the child and parent-

child attachment are protective factors for antisocial behaviour, while negative parenting practices including parental rejection, punitive, aggressive or coercive parenting, poor monitoring, low parental warmth and inconsistent discipline are risk factors for antisocial behaviour (Henry et al., 2001; Deković et al., 2003; Wasserman et al., 2003; Collishaw et al., 2012; Pettit et al., 1997; Baldry and Farrington, 2000). Other family level factors that also predict antisocial behaviour at a statistically significant level include: family level poverty or economic difficulties (Dubow and Ippolito, 1994; Chung, 2003; Huaqing Qi and Kaiser, 2003; McLeod et al., 1994); family structure including single parenthood, homes with parental separation, blended households, and nonintact families (Apel and Kaukinen, 2008; Anderson, 2002; Henry et al., 1993; Wells and Rankin, 1991; Rutter et al., 1998); and sibling effects, namely sibling conflict, negative sibling interaction and sibling collusion (Bank et al., 2004; Bank et al., 1996; Bullock and Dishion, 2002).

Family level risk factors have often been used to further explain the relationship between individual level risk factors and antisocial behaviour. For example, in addressing the relationship between adolescent alcohol use and later crime, Mason et al. (2010) also made a comparison between youth from low income versus middle income backgrounds. Different family level risk factors have often been connected to one another, in terms of causing and influencing each other. For example, single parenthood, especially single mother headed households, are more likely to live in poverty (Gillham et al., 1998; Walker et al., 2008), parents who experience economic hardship are more likely to engage in negative, hostile and aggressive parenting (Sampson, 1994), and siblings tend to have more conflicts when their parents engage in ineffective parenting (Bank et al., 2004).

Family level empirical studies on antisocial behaviour provide valuable resources to further understand family level influences on the development of antisocial behaviour. However, empirical studies that are limited to considering family level effects can only partly explain antisocial behaviour, as explained in the previous section on individual level factors. Family level factors, as with individual level factors, are not entirely separable from wider social and environmental factors, which means that identifying and interpreting individual and family level factors in isolation results in failure to take account of the impact of wider social and environmental factors on youth antisocial behaviour, as well as their inter-relationship with individual and family level factors. This raises the need for a comprehensive understanding of youth antisocial behaviour, which requires us to consider how these individual and family level factors and the wider context are connected, and how the effects of those different levels of factors can work both independently and interdependently to produce antisocial behaviour.

This view is addressed in the next section, which introduces empirical studies on the effects of neighbourhood and area level factors on antisocial behaviour.

3.4. Neighbourhood/area level effects on antisocial behaviour

The neighbourhood in which children and young people reside has direct and indirect effects on their development, resulting in complex and varying paths (Fabio et al., 2012; Ingoldsby and Shaw, 2002). The predictors of antisocial behaviour or delinquency among young people have also been studied at a neighbourhood/area level. For example, Shaw and Mackay (1942) attempted to understand the relationship between juvenile delinquency and structural conditions of communities. According to their social disorganisation theory, structural conditions of communities including racial heterogeneity, crime rate, residential mobility and social disadvantages can be utilised to explain the behaviours of residents (Sampson and Groves, 1989; Shaw and Mackay, 1942). Furthermore, the collective efficacy model tries to further explain the association between neighbourhood structural factors and behavioural outcomes among young people by considering neighbourhood perceptions of social networks, informal control and mutual trust (Leventhal and Brooks-Gunn, 2000; Sampson et al., 1997). Neighbourhood perception factors can influence children and adolescents through the supervising and monitoring of formal and informal institutions. The theories concerning neighbourhood effects on antisocial behaviour among young people are further described in Chapter 4.

3.4.1. Effects of neighbourhood structural factors

There is a considerable body of literature that identifies a relationship between neighbourhood level structural factors and antisocial behaviour/delinquency among young people, as originally suggested by the social disorganisation theory (Shaw and Mackay, 1942). Neighbourhood level structural factors that negatively influence the development or behaviour of young people have been referred to as neighbourhood disadvantage (Wikstrom and Loeber, 2000; Winslow and Shaw, 2007; Ingoldsby et al., 2006), neighbourhood deprivation (Kalff et al., 2001), poor neighbourhood (Jencks and Mayer, 1990; Mayer and Jencks, 1989), neighbourhood poverty (Sampson, 1994) and neighbourhood socioeconomic disparities/inequality (Odgers et al., 2012). To empirically measure these factors, different researchers have used diverse factors that capture neighbourhood disadvantage.

The different terms that have been used to describe neighbourhood disadvantage have been identified by Sellström and Bremberg (2006), who reviewed thirteen multilevel research studies on the relationship between neighbourhood level disadvantage and child and

adolescent outcomes. The thirteen studies used the following factors in measuring neighbourhood level disadvantage: socioeconomic deprivation, deprived neighbourhoods, neighbourhood disadvantage, concentrated disadvantage, material deprivation, poor area, residential stability and immigrant concentration. The findings from this review indicated that neighbourhood socioeconomic status had small to moderate effects on child behavioural problems on top of other child outcomes (e.g., birth weight, injuries, and child maltreatment) after taking account of important individual and family variables (such as gender, age, educational level, occupational status, parental education, parental involvement, and household income).

Another review on the relationship between neighbourhood level factors and early-onset antisocial behaviour by Ingoldsby and Shaw (2002) provided detailed information on the measurement of neighbourhood level structural factors that were used in predicting antisocial behaviour among children, which were:

- neighbourhood level poverty: low neighbourhood SES, economic deprivation, public housing, subsidised housing, high male unemployment, underemployed families, and proportion of receiving aid,
- neighbourhood level family structure: rate of single parenting,
- neighbourhood level crime: police records of crime and rates of adult crime,
- neighbourhood level educational status: proportion of residents without high school diploma, and
- neighbourhood level negative life events and homicide rates.

The findings of the review suggested that more significant neighbourhood level effects were found from middle childhood (in children aged between 6 and 14) rather than early childhood, suggesting that middle childhood is the period that neighbourhoods have greater influences on children's criminal or antisocial behaviour.

Many empirical studies have also measured the effects of neighbourhood level structural factors on antisocial behaviour, problem behaviour or delinquency and suggested that residing in a more disadvantaged neighbourhood is related to the higher level of antisocial behaviour, regardless of individual and family level risk factors. Some empirical studies have concentrated on cross-sectional, single-level studies of neighbourhood structural factors and the results of these studies provide strong consistent evidence that neighbourhood structural factors have effects on antisocial behaviour, delinquency and crime (Winslow and Shaw, 2007; Wikstrom and Loeber, 2000; Bursik and Grasmick, 1993a; Loeber and Wikstrom, 1993; Ludwig et al., 2001; Stouthamer-Loeber et al., 2000; Wikström, 1998; Graif, 2015). For

instance, Winslow and Shaw (2007) studied the impact of neighbourhood disadvantage on overt behavioural problems among young children using longitudinal data from a sample of 281 African American and European American boys living in urban cities of the Mid-Atlantic region (US). In Winslow's study, neighbourhood disadvantage was measured by median family income, the rate of families below the poverty line, the rate of households on public assistance, the rate of unemployed, the rate of single-mother households, and the rate of the residents with a Bachelor's degree or higher. Their findings suggested that boys living in disadvantaged neighbourhoods are at greater risk of having behavioural problems as they make the transition to elementary school (at aged 6) than boys from less disadvantaged neighbourhoods (i.e., low to moderate disadvantaged neighbourhoods). A similar study was conducted by Wikstrom and Loeber (2000), who used a sample of 890 male adolescents from the Pittsburgh Youth Study and measured the effects of neighbourhood level disadvantage on juvenile offending. Their findings suggested that neighbourhood socioeconomic status had direct effects on late onset delinquency for those adolescents who had a high score for protective factors, or who had a balanced level of risk and protective factors, while no significant direct relationship was found between neighbourhood socioeconomic status and early onset serious offending.

Another body of studies has considered the nested or clustered structure of the data (i.e., individuals nested in neighbourhoods) using multilevel methods (Anderson, 2002; Kalff et al., 2001; Schneiders et al., 2003; McVie and Norris, 2006). Kalff et al. (2001) conducted multilevel modelling in examining the effects of neighbourhood level disadvantages including unemployment rate, rate of dependence on social welfare, rate of single parent families, rate of non-voters, rate of foreign born and migrations on child problem behaviour using a sample of 734 children aged between 5 and 7 in the Netherlands. A multilevel random effects regression analysis presented that the effects of neighbourhood disadvantages existed after adjusting for individual level socioeconomic status, suggesting that residing in a more disadvantaged area is related to a higher level of problem behaviours among children, regardless of individual level deprivation. Schneiders et al. (2003) also tested the relationship between neighbourhood socioeconomic disadvantage and behavioural problems among children and adolescents using multilevel modelling. Schneiders et al. (2003) used 14-year longitudinal data, which was first gathered when the 2,578 participants from Rotterdam (Netherlands) were aged between 10 and 12. Their findings suggested that neighbourhood disadvantage has significant effects on problem behaviours among both children and adolescents even after parental socioeconomic status was accounted for. They highlighted that living in a deprived neighbourhood is related with a higher incidence of behavioural problems and may worsen the problems as children mature.

Other researchers have tested neighbourhood effects on older children or adolescents, also using multilevel analysis. McVie and Norris (2006) used multilevel modelling in predicting the effects of neighbourhood on youth delinquency and drug abuse using a sample of 4,328 secondary school students living in Edinburgh. The results indicated that neighbourhood level disadvantage influences delinquent and drug using behaviour, namely higher deprivation in the case of delinquency and greater crime rates for drug abuse, although the impact was relatively weak in comparison to the effect of individual level factors, namely gender and personality.

Some studies have tried to address the complicated association between family/parents, peers, neighbourhood and antisocial behaviour among young people (Odgers et al., 2012; Eamon, 2002). Odgers et al. (2012) examined whether neighbourhood level socioeconomic disadvantages make an independent contribution to children's involvement in antisocial behaviour across childhood using a longitudinal sample of 2,322 children and whether the neighbourhood effects on antisocial behaviour are mediated by supportive parenting, including maternal warmth and parental monitoring. Their findings revealed that the effects of neighbourhood socioeconomic disadvantages were observed as early as age 5 and, by age 12, the effects became as great as the effects observed for the strongest individual level predictor of antisocial behaviour, namely gender. They further confirmed that the variation in degrees and the proportion of antisocial behaviour across disadvantaged versus more affluent neighbourhoods were completely mediated by supportive parenting. Eamon (2002) considered neighbourhood level factors, parenting, and peer influence as mediation effects in measuring the relationship between poverty and youth antisocial behaviour, using a sample of 963 adolescents aged between 10 and 12 from the National Longitudinal Survey of Youth (US). Their hierarchical multiple regression results revealed that neighbourhood problems (i.e., neighbourhood level crime, violence, and unemployment) and delinquent peer pressure (i.e., pressure from friends to try cigarettes or illegal drugs) partially mediated the association between poverty and antisocial behaviour in late childhood. When the neighbourhood level risk was high, authoritarian parenting strategies lowered the levels of antisocial behaviour. Piotrowska et al. (2019) addressed the mediation effects of individual, family and neighbourhood factors when looking at the relationship between income and antisocial behaviour. They used a sample of 7,977 British children and adolescents aged between 5 and 16 from the B-CAMHS 2004 survey. In their study, neighbourhood condition was categorised as 'wealthy achievers', 'urban prosperity', 'comfortably off', 'moderate means' and 'hard pressed'. By conducting nested structural equation models, they found that neighbourhood disadvantage mediated the indirect effects of income on antisocial behaviours.

Graif (2015) studied extended neighbourhood (neighbourhoods and surroundings) effects on risk taking and delinquency by revisiting the Moving to Opportunity randomised intervention Study that sampled 1,591 Australian low-income youths. To find out the effects of residing in concentrated disadvantage on youths' risky and delinquent behaviour, Graif (2015) conducted a two-stage, least-squares approach. Her findings showed that the extended neighbourhoods had effects on the youths, but the effects were different by gender. Among the female youths, extended neighbourhoods without disadvantage concentration were related to a lower frequency of risk taking compared to extended neighbourhoods with disadvantage concentration. On the other hand, among the male youths, localised disadvantage concentration was related to a higher frequency of delinquency and risk taking.

Some studies have not found effects of neighbourhood structural factors on antisocial behaviour at a statistically significant level when other covariates were included in the model. McGee et al. (2011) examined the effects of neighbourhood disadvantage, immigration concentration, and residential mobility on antisocial behaviour using a sample of 3,817 Australian adolescents from the Mater University Study of Pregnancy Birth Cohort. An ordinary least squares multiple regression was conducted to address the relationship. When individual and family level factors were included in the model, neighbourhood disadvantage did not predict youth antisocial behaviour at a statistically significant level. Pauwels et al. (2015) addressed neighbourhood and school effects on offending using a sample of 612 Dutch youths (aged between 12 and 16) from the Study of Peers, Activities and Neighbourhoods. Their cross-classified multilevel analysis result revealed that no significant neighbourhood effects were found when unique school level variance was controlled.

Most of the above studies suggest that there are direct and indirect effects of neighbourhood disadvantages on antisocial behaviour or delinquency among young people regardless of individual and family level risk factors, although the effects are weaker than those of individual and family level risk factors. The relationship between neighbourhood structural factors and antisocial behaviour is stronger among older children and adolescents compared to young children (Ingoldsby and Shaw, 2002) and the mediation effects of parenting style and peer relationship have also been found (Eamon, 2002; Odgers et al., 2012).

3.4.2. Effects of neighbourhood perception factors

Neighbourhood perception factors, which are considered to have effects on antisocial behaviour/delinquency among young people, have been referred to as collective efficacy (Sampson et al., 1997; Odgers et al., 2009; Sampson et al., 1999; Sampson and Raudenbush, 1999), social control (Elliott et al., 1996), social capital (Oberwittler, 2004) and social connectedness (Rountree and Warner, 1999). Although the results of these studies are less

robust, they confirm the findings of neighbourhood structural studies that found that neighbourhood level factors influence the development of antisocial behaviour and delinquency among young people.

Many studies have used the concept of 'collective efficacy' (Sampson et al., 1997) in further explaining the relationship between neighbourhood disadvantages and delinquency among young people. In Sampson et al.'s (1997) study, which used the Project on Human Development in Chicago Neighborhoods, neighbourhood collective efficacy, which consisted of 10 items and represented the level of social cohesion and informal social control between residents, was introduced. 'Informal social control' was represented by five items, which asked the respondents whether their neighbours were willing to act for the common good of their neighbourhood.³¹ 'Social cohesion and trust' were also represented by five items, which asked the respondents how strongly they agreed (on a five-point scale) with each item that described trust between their neighbours.³²

Oggers et al. (2009), for example, measured the protective effects of neighbourhood collective efficacy on 2,232 British children aged between 5 and 10. They used a neighbourhood deprivation variable, which categorised British neighbourhoods into six different groups from the most affluent to the most deprived, using the ACORN classification (CICA (1997))³³, and adopted the collective efficacy measurement from Sampson et al. (1997). The results from the latent growth curve modelling indicated that children in disadvantaged neighbourhoods had higher rates of antisocial behaviour at school entry and a slower rate of drop-out from committing antisocial behaviour between the ages of 5 and 10 compared to those from more affluent neighbourhoods. Neighbourhood collective efficacy was negatively associated with antisocial behaviour at school entry but only in disadvantaged neighbourhoods, even after adjusting for family-level factors and neighbourhood problems. Oggers et al. (2009) concluded that neighbourhood collective efficacy may have protective effects on young people residing in disadvantaged neighbourhoods. Fagan et al. (2014) tried to measure the protective effects of neighbourhood collective efficacy on the relationship between experience of violence and violent behaviour using a sample of around 1,700 adolescents aged between 8 and 16 from

³¹ For example, if "children were skipping school and hanging out on a street corner", "children were spray-painting graffiti on a local building", "children were showing disrespect to an adult", "a fight broke out in front of their house", and "the fire station closest to their home was threatened with budget cuts" (Sampson et al., 1997, p.919).

³² The five items are as follows: "people around here are willing to help their neighbours," "this is a close-knit neighbourhood," "people in this neighbourhood can be trusted," "people in this neighbourhood generally don't get along with each other," and "people in this neighbourhood do not share the same values (the last two statements were reverse coded)" (Sampson et al., 1997, p.920).

³³ CICA developed A Classification of Residential Neighbourhoods (ACORN) which grouped British neighbours using 79 different items (i.e., educational qualifications, unemployment, single parent status, housing tenure and car availability). More information on ACORN can be found from CICA (1997).

the Project on Human Development in Chicago Neighbourhoods (PHDCN). They also adopted the collective efficacy measurement framework of Sampson et al. (1997) and found moderating effects for collective efficacy: the association between victimisation and substance use was weaker for adolescents in neighbourhoods with a higher compared to a lower degree of collective efficacy. Similar studies have been conducted using PHDCN and provided consistent results, which supports the argument that neighbourhood collective efficacy or social organisation have protective effects on the development of antisocial behaviour and delinquency among young people. Using a multilevel logistic regression, Browning et al. (2008) revealed a negative association between neighbourhood collective efficacy and sexually risky behaviour (having two or more partners) among adolescents aged between 11 and 16; in their multilevel analyses, Maimon and Browning (2010) discovered that neighbourhood collective efficacy weakened the effects of unstructured socialising (peer influence), which was a powerful predictor of violence.

In predicting antisocial behaviour, some studies have used a similar concept to collective efficacy, but adopted a different terminology or added other neighbourhood perception factors such as neighbourhood assets (Molnar et al., 2008) and social resources (Lenzi et al., 2012). Molnar et al. (2008) assessed the effects of neighbourhood resources on delinquent behaviour using a sample of 2,226 adolescents aged between 9 and 15 from the Project on Human Development in Chicago Neighbourhoods. In their study, social resources were further sub-grouped as collective efficacy (Sampson et al., 1997), organisations (i.e., neighbourhood watch programmes, mental health centres and youth centres) and neighbourhood assets (intergenerational closure and reciprocal exchange). The logistic regression and multilevel analysis results indicated that living in a neighbourhood with a greater concentration of organisations or services supporting children and adults was related to a lower degree of aggression. Lenzi et al. (2012) studied the effects of perceived neighbourhood social resources on prosocial behaviour in early adolescents using a sample of 1,145 Italian young adolescents (between 6th and 8th grade). Lenzi et al. (2012) also sub-divided perceived neighbourhood social resources into neighbourhood opportunities (i.e., whether respondents spent fun times in their neighbourhoods), neighbourhood cohesion (i.e., whether neighbours helped each other), neighbourhood friendship (number of friends in their neighbourhood), neighbourhood attachment (i.e., whether they felt part of the place) and perceived support of friends (i.e., whether their friends tried to help them). Their path analysis results showed that a higher level of perceived opportunities and social resources in the neighbourhood was associated with a higher degree of adolescent prosocial behaviour including sharing, helping and empathic behaviour.

Chung and Steinberg (2006) studied the effects of neighbourhood perceptual and structural factors, and parental and peer factors on delinquent behaviour using a sample of 488 serious male juvenile offenders aged between 14 and 18 from economically deprived ethnic minority families. The findings from the structural equation modelling analyses suggested that low levels of neighbourhood social organisation were indirectly associated with delinquent behaviour through its relationship with parenting behaviour and peer delinquency. Chung and Steinberg (2006) concluded that concentrating on just one of these microsystems may lead to oversimplified models of risk for adolescent delinquency. Cuervo et al. (2018) studied the effects of neighbourhood perception, attitudes towards violence, and self-control on delinquency using a sample of 2,309 Belgian youths aged between 12 and 18. The neighbourhood perception used by the study was young people's perception of the physical environment of their neighbourhoods and of the attitudes of the residents. When tested using negative binomial regression, the perception of the neighbourhood was associated with non-violent offences.

3.4.3. Summary of neighbourhood level effects on antisocial behaviour

Section 3.4. provided a review of the empirical studies on the relationships between neighbourhood conditions and the development of antisocial and criminal behaviours. The empirical studies that have been published on neighbourhoods and young people's antisocial behaviour, offending and delinquency since 1990 are still dominated by American research. Few studies have focused specifically on the relationship between antisocial behaviour and neighbourhood effects in the UK, which makes generalisation to the UK context difficult.

Although neighbourhood level conditions such as disadvantage and poverty are well-known conditions that are often mentioned in connection with youth antisocial behaviour, a variety of factors such as unemployment rate, rate of dependence on social welfare, rate of single parent families, rate of non-voters, rate of residents who are born in foreign countries, rate of migrants and rate of residents with high/low level educational status have been used to capture neighbourhood level structural conditions in addressing the relationship between neighbourhood level characteristics and antisocial behaviour among young people. Moreover, some neighbourhood level studies have further included neighbourhood perception factors such as collective efficacy (see section 4.2.3), which has widened the understanding of antisocial behaviour.

As most of the neighbourhood studies concerning structural factors have tended to use a limited number of population composition variables (i.e., rates of unemployment, rates of low income, etc.), they have mostly omitted variables linked to physical or institutional characteristics of neighbourhoods, for example youth services or children's centres, probably

due to a lack of data availability. It could be argued that “since negative physical and institutional characteristics tend to be strongly correlated with concentrated poverty, their effects will be indirectly picked up by studies of these measures” (Lupton, 2003, p.8).

Meanwhile, many studies on neighbourhood structural factors’ effects on antisocial behaviour have used composite measures of neighbourhood disadvantage that include a mixture of measures that capture different aspects of neighbourhood disadvantages. For example, Winslow and Shaw (2007) used six neighbourhood level conditions (e.g., percentage of unemployment and percentage of families below the poverty line) to create a neighbourhood disadvantage variable (see also, Odgers et al., 2012; Wikstrom and Loeber, 2000). This allows us to simplify a variety of neighbourhood conditions effects on antisocial behaviour into a single relationship. For example, McCulloch and Joshi (2000, p.8) used a compound score of neighbourhood level deprivation, which provided them “the advantage of simplicity in allowing areas to be ranked against each other for statistical comparisons”. However, the use of a composite measurement of neighbourhood conditions makes it difficult to identify which neighbourhood characteristics have significant influences on young people and which do not. This is an important factor in deciding, for example, whether the likelihood of youth antisocial behaviour increases when they live in high poverty neighbourhoods with a high unemployment rate or only when they live in predominantly high poverty neighbourhoods.

In addition, the review of the neighbourhood level studies on antisocial behaviour shows that the relationship between antisocial behaviour and neighbourhood level characteristics operates differently depending not only on the different characteristics of neighbourhoods but also on the different types of antisocial behaviour. For example, in McVie and Norris’ (2006) study, the effects of neighbourhood deprivation were significant for juvenile delinquency but not for drug abuse, while the effect of the neighbourhood level crime rate was significant for drug abuse but not for juvenile delinquency. This indicates the need to adopt a different theoretical framework in understanding the contextual effects of neighbourhoods on different antisocial behaviour subgroups. In addition, Chung and Steinberg (2006) study showed the integrated relationship between individual, family and neighbourhood factors and delinquent behaviour, and found an indirect association between low levels of neighbourhood social organisation and delinquent behaviour that operated through its relationship with parenting style and peer delinquency. Chung and Steinberg’s (2006) study suggests that understanding antisocial behaviour by focusing on just a single level of factors may lead to oversimplified models of risk for youth antisocial behaviour.

Although a considerable number of empirical studies have come up with statistically significant neighbourhood level effects on antisocial behaviour, their findings across a diverse spectrum

of neighbourhood models need to be interpreted with caution. Moreover, as with individual and family level factors, the role of neighbourhoods in understanding antisocial behaviour needs to be understood in conjunction with different levels of factors.

3.5. Conclusion

This chapter reviewed the empirical evidence on the determinants of antisocial behaviour in order to integrate theory and evidence together. A variety of factors that influence antisocial behaviour are categorised into the different levels of individual, family, and neighbourhood. Each level of factors makes unique contributions to the understanding of antisocial behaviour among young people. The following factors are suggested to be associated with antisocial behaviour among young people:

- Individual level factors: genetic influence (Arseneault et al., 2003); psychological effects such as poor neuropsychological condition, poor verbal ability, impulsivity, extraversion, disinhibition, psychoticism and low empathy (Romero et al., 2001; Jolliffe and Farrington, 2007); gender differences (Hoeve et al., 2012; Jacobson et al., 2002); age differences (Bartusch et al., 1997); alcohol intoxication (Rossow et al., 1999); illegal drug use (Johnston et al., 1993); and peer influence including peer pressure (Eamon, 2002; Steinberg, 2000) and delinquent peer groups (Henry et al., 2001; Jaffee et al., 2012),
- Family level factors: parenting style – namely parental rejection, parental responsiveness, parental involvement with the child, (Deković et al., 2003), punitive or aggressive parenting (Pike et al., 1996; Waller et al., 2013), lack of supervision, weak parent-child attachment (Sampson, 1994), parental monitoring, parental interest and parent-child quality time (Collishaw et al., 2012); poverty or economic hardship (Dubow and Ippolito, 1994; Eamon, 2002; McLeod et al., 1994); family structure including non-intact families (Apel and Kaukinen, 2008) and single parenthood (Anderson, 2002; Amato and Keith, 1991); sibling effects such as sibling conflict (Bank et al., 2004) and coercive interaction between siblings (Bank et al., 1996); and paternal antisocial personality disorder and paternal substance use (Frick et al., 1992; Loeber et al., 1995),
- Neighbourhood level structural factors: median family income; families below the poverty line; households on public assistance; unemployment; single parent/mother households; percentage of Bachelor's degree or higher; non-voters; foreign born and migrants; concentrated disadvantage; and the crime rate (Winslow and Shaw, 2007;

Kalff et al., 2001; Schneiders et al., 2003; McVie and Norris, 2006; Graif, 2015; Eamon, 2002), and

- Neighbourhood level perception factors³⁴: collective efficacy such as informal social control and social cohesion (Sampson et al., 1997; Odgers et al., 2009; Fagan et al., 2014; Browning et al., 2008); neighbourhood assets such as intergenerational closure and reciprocal exchange (Molnar et al., 2008); and perceived social resources including neighbourhood opportunities, neighbourhood cohesion, neighbourhood friendship, neighbourhood attachment and perceived support of friends (Lenzi et al., 2012; Cuervo et al., 2018).

The results of the different empirical studies do not always point in the same direction. For example, some studies show a significant relationship between alcohol use and antisocial behaviour (Rossow et al., 1999), and between illegal drug use and antisocial behaviour (Johnston et al., 1993), or a reciprocal relationship between substance use and antisocial behaviour, while other studies failed to find a clear causal relationship between substance use and antisocial behaviour (White et al., 1993a; White et al., 1993b; White, 1992; Dembo et al., 1991).

Studies on individual and family level effects on antisocial behaviour are valuable as their findings provide grounds for various individual and family level policy and intervention programmes or services to reduce antisocial behaviour among young people. However, the application of their findings requires caution since these findings could mislead us into drawing unwarranted conclusions about the main determinants of antisocial behaviour, for example, that it is a product of certain genes in certain people, psychological problems within individuals, dysfunctional parenting, poor families, etc. Neighbourhood level studies are also meaningful as they further inform wider area level effects on antisocial behaviour that cannot be explained by individual and family level factors. With the findings from the neighbourhood level studies, it is possible to suggest that in order to reduce antisocial behaviour among young people, reducing material inequalities between different neighbourhoods such as the poverty rate and unemployment rate are required.

As individual level factors in isolation cannot explain the prevalence of antisocial behaviour in more disadvantaged areas, neighbourhood level effects on antisocial behaviour make more sense when explained together with individual and family level effects (see for example, Chung and Steinberg, 2006). In this regard, the review of the empirical studies in this chapter demonstrates that antisocial behaviour cannot be simply explained by one or two risk factors

³⁴ For more information on collective efficacy, neighbourhood assets and perceived social resources please refer to Chapter 4.

or by a single level of risk factors but, rather, that various individual, family and neighbourhood level factors are interconnected in developing antisocial behaviour. For example, at an earlier stage, geneticists only considered genetic effects when explaining antisocial behaviour (for example, see Miles and Carey, 1997). Later studies, however, tried to further explain antisocial behaviour with the interplay of genetic and environmental factors (for example, see Moffitt, 2005a; 2005b). Some neighbourhood level studies have also tried to understand the complex relationship between individual, family and neighbourhood level effects on antisocial behaviour. However, in most of the studies, individual and family level risk factors have been used as control variables. Some studies have used a lower-level factor as a mediation effect, for example, in addressing the relationship between neighbourhood socioeconomic disparities and antisocial behaviour. However, most studies have not estimated this complex relationship, which also includes the interactions between different individual, family and neighbourhood level factors.

The review of the studies of individual, family and neighbourhood level determinants of antisocial behaviour in this chapter reveals the need for an integrated understanding of antisocial behaviour but the mechanism of this complex relationship between the different levels of factors and antisocial behaviour has not yet been addressed. Also, the mechanism for the wider environmental effects on antisocial behaviour has not yet been explained. Thus, in the next chapter, neighbourhood process models including social disorganisation theory, social capital theory and the collective efficacy model, which explain how the wider environmental factors actually influence the occurrence of antisocial behaviour, are introduced. In addition, the social ecological perspective is introduced as a guiding theoretical framework for this study. It is argued that this approach aids the understanding of antisocial behaviour by studying the interactions and relations between young people, and their social and environmental surroundings and community settings (France et al., 2012; Johns et al., 2017). Thus, this theory provides a useful perspective, whereby human behaviour including antisocial behaviour should be understood considering the associations between various factors from different levels (i.e., individual, family and neighbourhood).

Based on the research frameworks, the present study builds a research model, which includes individual, family level and neighbourhood level factors in explaining antisocial behaviour as well as cross-level interactions between individual and family level factors and neighbourhood level factors in the analysis model (see Chapter 5). This will allow this study to investigate the interconnected relationship between the different levels of factors in predicting antisocial behaviour, which has not been successfully addressed by the previous studies.

Chapter 4. Research background and theoretical framework

Chapter 3 discussed how the previous empirical studies have attempted to explain antisocial behaviour. A variety of studies have addressed the relationship between antisocial behaviour and factors from the individual (e.g., gender and illegal drug use), family (e.g., household income and parenting style) and neighbourhood (e.g., poverty and informal social control) levels. However, as these studies on antisocial behaviour and youth development mature, the need arises for the integration of the different levels of studies, from individual to microsocial-level studies of relationship dynamics, to the analysis of context, such as neighbourhoods and communities. In this regard, this chapter begins by introducing a socioecological theory (Bronfenbrenner, 1979), which is useful in explaining young people's behaviours by incorporating different levels of systems (micro, meso, exo, macro, and chrono system) (explained later in section 4.1). Within the social ecology framework, the factors that influence human behaviours are inter-connected which can be understood as operating at different levels simultaneously (Johns et al., 2017; France et al., 2012). Importantly, a young person's antisocial behaviour can be depicted not within a single level (e.g., microsystem) but as a set of interconnected influences of different factors from different levels, including individual, family and neighbourhood. Therefore, this chapter introduces some of the most important theories that have been developed to explain the interrelated relationship between young people, their surrounding social ecological environment and their involvement in antisocial behaviour.

On top of area level studies, there is a body of studies that attempts to explain delinquency and crime by addressing the effects of individual and family level factors, which are also important in understanding young people's antisocial behaviour. For example, Hirschi and Gottfredson (1990, 1993) introduced the general theory of crime, which argued that there is a connection between low self-control and deviant behaviour. They viewed the cause of deviant behaviour as undeveloped self-control, which is formed when children are young. Children may have low self-control when there is a lack of parental supervision, and their problem behaviour is not recognised or responded to by their parents. According to this theory, individuals with high self-control do not tend to get involved in deviant behaviours. They assert that self-control is a general concept that can explain all of the factors related to criminal behaviour (Gottfredson and Hirschi, 1990; Hirschi and Gottfredson, 1993). However, there is a criticism of this assertion, which is that it is difficult to empirically test all of the related factors. In addition, this theory has been criticised since low self-control is not recognised as being the

only predictor of criminal behaviour (Wickert, 2022). The theory is also viewed as tautological and has been accused of circular reasoning (Akers, 2013; Wickert, 2022).

Another theory that focuses on the family and individual level causes of crime is the family stress model (Angell, 1936; Cavan and Ranck, 1938; Hill, 1949), which explains children's outcomes including juvenile delinquency by stressing the impact of poverty and financial hardship on parents. This theory posits that poverty and socioeconomic disadvantage affect parental mental health, cause conflict between parents, and make parenting more difficult, which in turn negatively affects children (Malia, 2006; Gard et al., 2020). According to this model, poverty or socio-economic difficulties cause a variety of stresses to the family, which also affect family functioning and child adoptability, mainly via the economic difficulties the family faces (Neppl et al., 2016). The family stress model provides a useful view in understanding the family process that leads to problem behaviours especially during the early years of life considering the essential parental emotional influence on the behaviours of infants and middle childhood children (Gard et al., 2020).

While studies such as the general theory of crime (Gottfredson and Hirschi, 1990; Hirschi and Gottfredson, 1993) and the family stress model (Neppl et al., 2016; Gard et al., 2020) focus on individual and family level factors in explaining youths' behaviour including crime, other studies have stressed the limited scope of the research on criminal behaviours, which does not account for wider area level effects. In the 1940s, the Chicago School "shifted the study of crime away from the individual (i.e., psychology) and towards social structure (i.e., sociology)" (Hollin, 2012, p.87). Since then, a broader understanding of antisocial behaviour has been developed in the studies of the social structures that built, affected, and defined the social ecological theory. For example, a number of studies by Shaw and McKay (1942) demonstrated how the occurrence and persistence of juvenile delinquency is linked to area level deprivation, disorganisation, and disadvantage (discussed later in section 4.2.1). These studies by the Chicago School provided a new perspective: that antisocial behaviour cannot be understood merely as an individual pathology, rather it is explained more clearly when understood as a problem that was influenced by the wider society (Lilly and Ball, 1995).

This view was further developed by Bronfenbrenner's (1979) ecology of human development theory, which was first introduced in the 1970s as a conceptual model, before being formalised as a theory in the 1980s. Since then, this approach has been adopted by a variety of empirical studies in understanding human behaviour including antisocial behaviours. Based on the Chicago School's view that antisocial behaviour/crime could be more comprehensively understood by considering social structures, the social ecological theory expanded the focus

of study to include the dynamic interrelations between various individual, social and environmental factors. Therefore, this study adopts some aspects of social ecological theory in building an empirical model to test the integrated relationship between antisocial behaviour among young people and their surrounding social and structural environment (discussed later in this chapter).

Bronfenbrenner's (1979) social ecological framework provided a view to link the different factors from various social ecological systems into the antisocial behaviour model. However, how these neighbourhood conditions influence antisocial behaviour has been more clearly addressed by neighbourhood process theories including social disorganisation theory, social capital theory, and the collective efficacy model. These theories and models are also influenced by the social ecological framework but were developed specifically to address the relationship between neighbourhood or community characteristics and antisocial or criminal behaviour. Thus, this chapter first introduces the social ecological theory and then further explains how the theory is adopted in the analysis model of this study (section 4.1). The chapter then introduces key theories that explain the process of neighbourhood level factor effects on antisocial behaviour and discusses the relationship between these process models (section 4.2).

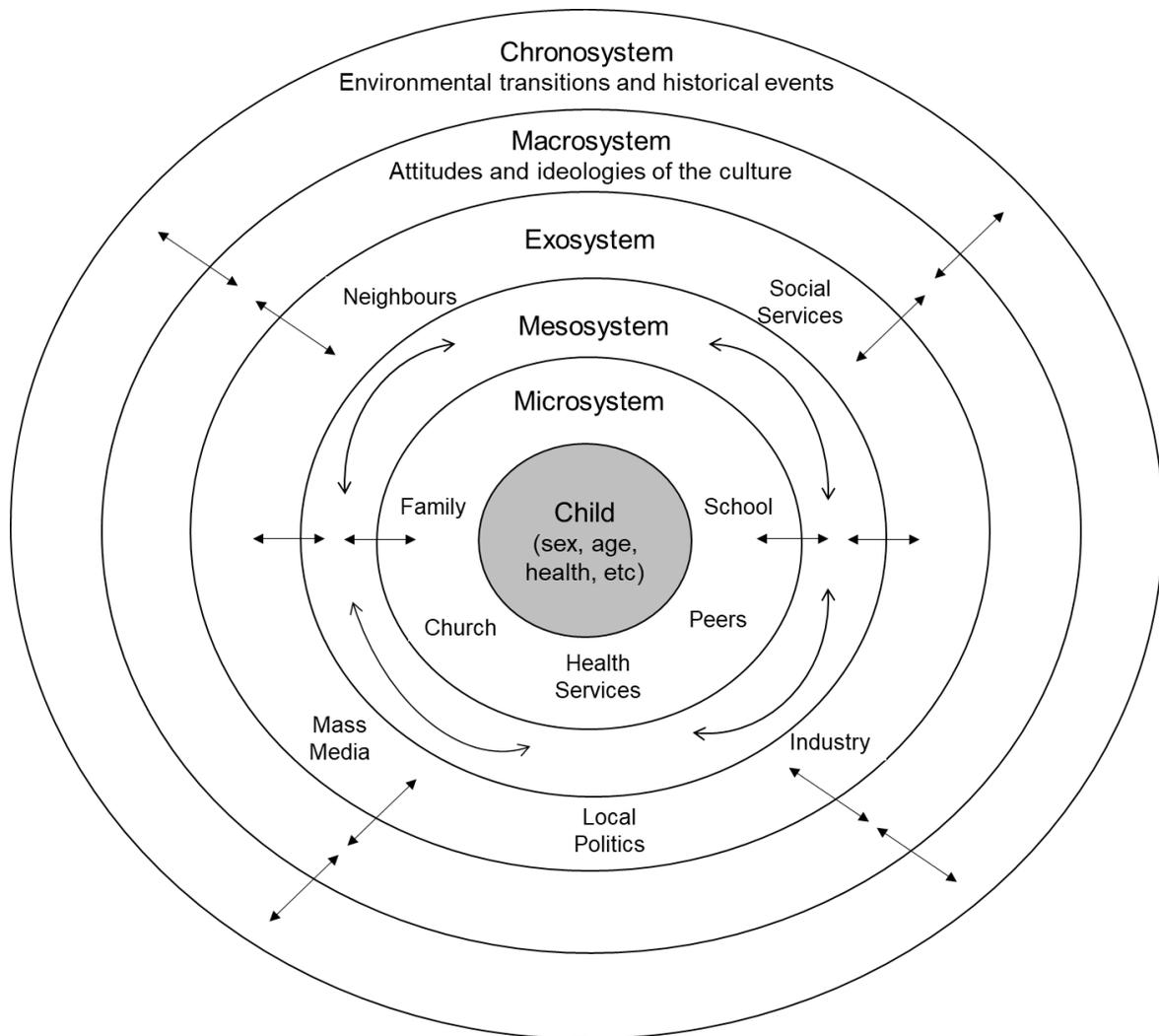
4.1. A social ecological theory of antisocial behaviour among young people

There is a consensus in the literature that no single factor or single level of factors fully explains the occurrence of antisocial behaviour (e.g., Sullivan, 2014; Anderson et al., 2015; Martin, 2019; Dishion and Patterson, 2015). While earlier studies of antisocial behaviour and youth crime contributed to identifying different levels of risk factors related with antisocial behaviour, these studies did not offer a strong etiological model that explains the complicated inter-relationship between the factors. However, a broadly agreed current view is that risk factors are interconnected and situational and work in the broader contexts of social ecology where antisocial behaviour arises (Johns et al., 2017). This view is supported by a growing number of studies on youth crime or youth behaviours that have adopted an ecological framework (e.g., Taylor et al., 2011; Schulenberg et al., 2007; Martin, 2019; Johns et al., 2017).

Bronfenbrenner's (1979) social ecological theory allows the focus of study on young people to expand beyond the individual, and to incorporate more real life settings, including family, friends and neighbourhoods (Martin, 2019). This framework takes multidimensional perspectives in understanding outcomes associated with the development of young people

within hierarchical environments (Ennett et al., 2008). Building on Bronfenbrenner (1979; 1981; 1994), a set of interconnected ecologies is distinguished between the microsystem, mesosystem, exosystem, macrosystems and chronosystem, as shown in figure 4.1.

Figure 4.1 Bronfenbrenner's (1979) ecological theory of development



Note: This figure is adapted from McLaren and Hawe (2005) and Guy-Evans (2020).

Within the social ecological perspective, the microsystem refers to the immediate system in which young people actively participate. This system comprises the young people in their interrelations with the physical, social and symbolic characteristics of their families, peers and school settings (Johns et al., 2017). For example, the family is considered as a microsystem, which is the most intimate environment for a young person that influences their experience and behaviours via factors such as child-parent relationships, sibling interactions and the economic status of family members (Heilmann, 2013). As reviewed in Chapter 3, parenting

style, sibling effects and family structure have been suggested to be some of the important factors in the microsystem that explain antisocial behaviour among young people.

The mesosystem refers to the interactions between two or more settings in which the young people actively participate, including the interrelationships between home, school, church and peer group (Johns et al., 2017; Bronfenbrenner, 1981). For example, when the child enters school, there exists a direct link between the two microsystems, school and home. There may exist a conflict between what the young person learns about criminal behaviour from school and from home, which might have a direct influence on them (John et al., 2017).

The exosystem consists of one or more settings that do not include the young people as active participants, while indirectly affect them as they influence one of the microsystems (Bronfenbrenner, 1981). This system comprises community or neighbourhood level conditions and social networks that affect dynamics at the microsystem level. For example, young people's behaviours are influenced by the social organisation of their neighbourhood such as informal social control and social networks, social norms, the physical conditions such as access to parks and green spaces, and the availability of institutions including neighbourhood services, police and schools (Leventhal and Brooks-Gunn, 2000; Maggi, 2010).

The macrosystem refers to "consistencies, in the form and content of lower-order systems (micro-, meso-, and exo-) that exist, or could exist, at the level of the subculture or the culture as a whole, along with any belief systems or ideology underlying such consistencies" (Bronfenbrenner, 1981, p.26). This incorporates the dominant socio-cultural features of where the systems are embedded and the local and national government discourses, ideologies, and policy (Cross and William, 2017; Johns et al., 2017; Bronfenbrenner, 1994). One of the important fundamental causes of antisocial behaviour is embedded within the socio-political circumstances of the larger society (macrosystem) through for example, the youth justice system and education and welfare policies. As reviewed in Chapter 2, the social and political contexts and their reaction towards antisocial behaviour have been changing depending on different governments' policy approaches and different social and political discourses, which have also influenced how society views young people and their behaviours.

The Chronosystem is the highest level of Bronfenbrenner's social ecological system theory (Guy-Evans, 2020). This system was added later in the model to consider transitions over time, both within the person and in the environment surrounding the person to find out how the transitions influence development (Bronfenbrenner, 1986). The Chronosystem comprises all the social transitions occurring during the lifetime that affect development, such as historical events and essential life transitions including normal life transitions (e.g., entering school) but

also some specific transitions (e.g., moving to a new area). This system focuses on how and when important transitions take place and stresses the role of the timing of the events, which could affect the life of the person.

Within this social ecological systems framework, young people's antisocial behaviour could be understood as the interrelationships and interdependence between their surrounding environments (e.g. neighbourhoods) that are geographically and socially defined (France et al., 2012; Bronfenbrenner, 1981). This approach is useful in exploring and understanding young people's antisocial behaviour. It allows for an examination of antisocial behaviour in relation not only to young people's individual characteristics, but also to their family and neighbourhood and the societal effects that surround them (Johns et al., 2017). An ecological framework (Bronfenbrenner, 1979; 1989) is helpful for organising these levels of analysis.

Indeed, a growing number of studies on antisocial or crime-related behaviours are adopting the ecological framework (e.g., Taylor et al., 2011; Schulenberg et al., 2007; Martin, 2019; Johns et al., 2017). A number of empirical studies, primarily in the US, concerning youth antisocial, offending or criminal behaviour that specifically used quantitative approaches also adopted the social ecological framework in modelling antisocial behaviour. For example, the social ecological framework has been adopted to examine the inter-relationship between the societal and structural environments surrounding young people and persistent youth offending (Verrecchia et al., 2010), youth reoffending (Wright et al., 2014), alcohol misuse in adolescence (Ennett et al., 2008), youth gang entry (Merrin et al., 2020), antisocial behaviour in children and adolescents (Tolan, 1995) and youth violence (Tolan, 2003). These studies provide useful information on how this framework was adopted in their quantitative analysis model. For example, although it does not directly measure antisocial behaviour, Ennett et al.'s (2008) study on youth alcohol misuse demonstrates how each system of the social ecology can be operationalised in a quantitative study. In their study, the microsystem is quantified by some of the social contexts surrounding adolescents, including family factors (e.g., parental supervision and parent-adolescent closeness), peer factors (e.g., alcohol misuse among friends) and school factors (e.g., school bonding and relative density of the school network). The exosystem was measured by neighbourhood factors (e.g., neighbourhood bonding and neighbourhood informal social control) and the mesosystem was measured by interactions between different factors from the microsystem (e.g., interactions between family and peer effects and between school and family effects). Ennett et al. (2008) attempted to make a thorough use of the social ecological framework and undertook an extensive contextualisation process in adopting this framework compared to other studies, for example, Tolan et al. (1995) and Anderson et al. (2015), who adopted limited ecological systems in their study. However,

Ennett et al.'s (2008) study still did not measure the interactions between the microsystem and the exosystem (e.g., the interaction between peer effects and neighbourhood effects) and between adolescents' individual characteristics (i.e., gender) and social contexts and did not assess the influence of the macrosystem or cultural factors.

As with Ennett et al.'s (2008) study, most of the quantitative studies on youth antisocial behaviour that adopted a social ecological framework did not examine the interactions between individual characteristics and the exosystem; nor did they incorporate the macro- and chronosystems in their models. Since the macrosystem includes "the local, state, and national government narratives, ideologies, and social policies" (Cross and William, 2017, p.767) and the chronosystem includes the environmental and historical transitions, they are not easy concepts to measure quantitatively. Although the social ecological theory provides a useful perspective in understanding youth antisocial behaviour by incorporating the micro, meso, exo, macro, and chrono systems, it is challenging to empirically examine all of the components. Thus, it is difficult for explanatory models to be applied, since this requires an extensive scope of ecological details to argue that all aspects of someone's environment have been taken into account.

Since this study aims to understand the inter-related association between individual, family and neighbourhood level effects and antisocial behaviour among young people, the conceptual framework is largely influenced by the social ecological theory. The analysis recognises that the everyday environments, including the neighbourhood that young people are engaged and interacting with, are products of broader social and political effects found at various different levels (within the micro-, meso-, exo-, macro and chrono systems). The following ecological systems from the social ecological theory are included to explain antisocial behaviour among young people, namely the individual (individual characteristics), the microsystem (family and friend effects), the mesosystem (interactions between family and friend effects) and the exosystem (neighbourhood effects and interactions between neighbourhood and lower level factors). The macrosystem (cultural and political system) and chronosystem (environmental transitions) are not included in the analysis model but how the antisocial behaviour issue has been shaped in British society, as well as policy responses and their influence on antisocial behaviour, is described in Chapter 2. However, although this study is broadly informed by social ecological theory, the structure and methodological approach does not allow the direct application of this framework. Therefore, Bronfenbrenner's (1979; 1981; 1994) framework is used as a broad guideline when interpreting the results of the research.

Within the analysis model of this study (see Figure 4.1), the individual level includes young people's individual characteristics (e.g., gender) and individual behavioural factors (e.g., use of illegal drugs and risk taking behaviour); the microsystem includes family and friend-related factors (e.g., parenting style and drug taking friends); the mesosystem includes the interactions between family and peer group (e.g., interactions between parental supervision and drug taking friends); and the exosystem includes neighbourhood structural factors (e.g., rate of deprivation), neighbourhood perception factors (e.g., residents' perceptions of the safety of the neighbourhood) and interactions between neighbourhood factors and low-level factors (e.g., interactions between gender and neighbourhood unemployment rate). The rationale for choosing each level of factors in the model is described in the literature review chapters (Chapter 3 and Chapter 4).

As discussed in this section, the social ecological theory provides a way of understanding the different levels of effects on antisocial behaviour among young people. However, the specific factors related to the neighbourhood conditions where antisocial behaviour is more likely to occur are still unclear. It is unclear how neighbourhood conditions, such as unemployment rate and poverty rate, which are allegedly related to antisocial behaviour (Winslow and Shaw, 2007), influence the occurrence of antisocial behaviour. Furthermore, whether and how these neighbourhood level characteristics interact with or mediate the influences of individual and family level characteristics is unclear and requires further explanation. Thus, in the following section, neighbourhood process models that are developed specifically to address the association between neighbourhood or community effects and antisocial or criminal behaviour are discussed.

4.2. Process models of neighbourhood effects: How do neighbourhoods influence young people's lives?

In recent years, the UK government's main approach to dealing with antisocial behaviour issue has been based on a risk factor approach, which has focused less on the social context of youth crime and antisocial behaviour and placed more emphasis on individual/family and community responsibility and accountability (Muncie, 2005; France et al., 2012). However, a growing number of studies, primarily in the US, have paid attention to understanding the impacts of neighbourhoods on the behaviours/outcomes of young people (Leventhal et al., 2009; Sampson, 2006; Wikström and Sampson, 2003; Sullivan, 2014), following the Chicago School scholars (discussed earlier in this chapter).

At the neighbourhood level, young people's antisocial behaviour has been mostly examined from social organisation, structural environmental perspective (see review in Bursik and Grasmick, 1993b). One of the earliest empirical studies to adopt an ecological perspective on the development of delinquent or criminal behaviours was Shaw and McKay's (1942) social disorganisation theory which argued that antisocial behaviour is associated with neighbourhood/community conditions, such as poverty, ethnic diversity, and residential mobility, especially in urban areas. More recently, researchers have started to recognise the effects of neighbourhood collective efficacy in understanding young people's behaviours (Sampson, 2006).

Several theoretical frameworks, including social disorganisation theory and the collective efficacy model, have been used to address the linkage between neighbourhood characteristics and young people's behaviours. According to Jencks and Mayer (1990), the majority of the theoretical frameworks, namely social disorganisation theory, the collective efficacy model, social capital theory, the community institutional resource model and the epidemic model, have addressed the disadvantages of disadvantaged neighbours (e.g., the negative effects of a high crime rate or scarce institutional resources in a neighbourhood on antisocial behaviour). Meanwhile some models, including the relative deprivation model and the competition model, have stated the disadvantages of advantaged neighbours. For example, depending on the relative deprivation model, young people judge their socioeconomic status by making a comparison with that of other people in their society. Young people may judge themselves as deprived on any dimension by comparing themselves to more affluent neighbours in their community and the relative deprivation perceived by young people motivates crime (Webber, 2021). This model is useful, as it addresses the reason why some individuals from a deprived environment get involved in delinquency while others do not; however, it is also criticised for its failure to address the reason why some individuals who perceive that they are relatively deprived do not commit crime.

Even though these models and theories try to explain the variations in child outcomes using neighbourhood characteristics, the mechanism they use to address the relationship differs. Thus, among the different theoretical frameworks, this section focuses on social disorganisation theory, social capital theory and the collective efficacy model, since they specifically concern antisocial, delinquent or criminal behaviour among young people and

provide a potential explanation of the inter-relationship between neighbourhood characteristics and antisocial behaviour.³⁵

4.2.1. Social Disorganisation Theory

Social disorganisation theory was developed by Shaw and Mackay (1942) in order to explain juvenile delinquency and crime in urban neighbourhoods. The theory was based on earlier studies on crime, namely 'The Polish Peasant in Europe and America' (Thomas and Znaniecki, 1918) and 'The City' (Park et al., 1925), which tried to address the connection between cities with different characteristics and crime. Shaw and Mackay's (1942) social disorganisation theory hypothesised that there is a direct connection between different rates of delinquency/crime and the conditions in local areas such as economic status, the adult crime rate, residential heterogeneity, the rate of single parenthood and ethnic diversity (Leventhal and Brooks-Gunn, 2000; Shaw and McKay, 1969; Kim, 2004). For example, from their empirical research, Shaw and McKay (1942) found that the diversity in the rates of recorded delinquency in areas of the city corresponded to the diversity in economic condition. The areas with the highest degrees of delinquency contained the fractions of the population whose status was the most disadvantageous in terms of the distribution of economic, social and cultural standards.

According to the theory, in wealthy areas with low rates of crime, the residents tend to share similar attitudes towards conventional values (e.g., opinions on the welfare of children (Shaw and McKay, 1969). In these areas, institutions and voluntary associations conduct effective social control to perpetuate and protect the shared conventional values. In contrast, in poor areas with high rates of crime, wide diversity in standards and norms of behaviours is found. These diverse values are symbolised by institutions and groups ranging from adults involved in stealing and the sales of stolen products, on the one hand, to churches and schools that stand for conventional values, on the other. Therefore, within the same area, shoplifting may be considered acceptable by some group of people and wrong, unacceptable and immoral by other groups. Young people living in those areas experience contradictory models and standards of behaviour rather than a comparatively coherent and traditional pattern. Young people may join groups committing delinquent behaviours, groups following conventional values, or groups that alternate between the two.

In this model, social organisation refers to community institutions and voluntary associations that represent the dominant values of the residents and conduct effective social controls, for

³⁵ See Jencks and Mayer (1990) for more information on the epidemic model, relative deprivation theory, the institutional resource model and the competition model.

instance, supervising and controlling street teenage groups. In areas with high rates of delinquency, a wide variety of conflicting values may exist, which hinder the practical unanimity of opinion in solving problems that threaten the conventional values. In those areas, indigenous organisations including neighbourhood services and centres, churches, local clubs, and parent-teacher associations do not function effectively in maintaining social control. Moreover, the family as an organisation also fails to effectively direct young people's activities, since it is influenced by the different values faced in various ways; delinquent groups rather than their family may have stronger effects on young people and families face new types of problems that do not have a traditional solution. Residents living in communities with high rates of deprivation may also have less cohesive opinions towards problems of public wellbeing due to their experiences of poverty, the wide variety of cultural backgrounds and high residential mobility among the residents. Often, residents in these areas attempt to acquire economic security and move into more affluent residential communities. As a result, the immediate problems of the current neighbourhood might not be of great consideration to them.

According to this theory, neighbourhood effects on delinquency and crime occur through this trajectory (Shaw and McKay, 1969): firstly, young people living in poor areas with high adult crime rates have more chance of coming into contact with gangs or criminal groups. Various conflicting values and standards may exist in these disadvantaged communities, which make it difficult for practical unanimity to exist among the residents in terms of conventional values, for example, in relation to child problems or welfare. The residents living in these communities may be less able to intervene for the common good in the community and, therefore, the indigenous institutions that could conduct voluntary social control are weak. This allows crime to thrive and gangs to develop in the area; residents move away or are less motivated or able to take action against it. Crime and the norms and beliefs related to it are then delivered from one generation to the next through social interactions between young delinquents and older criminals. Without supervision and informal social control in the community, juvenile delinquency occurs fairly easily. In socially disorganised communities, delinquency and crime are simply a normal reaction to the conditions in the area.

Shaw and McKay (1942) maintained that behaviours such as antisocial behaviour, like norm-compliant behaviour for that matter, transcended individual factors (e.g., gender). Thus, antisocial behaviour, they argued, is a product of specific types of neighbours/areas, and thus an aggregate measure of neighbourhood organisation is what requires research/policy/practice attention. According to their theory, to make changes to individual behaviour, structural change in the neighbourhood needs come first.

A main contribution of social disorganisation theory to understanding the causes of antisocial behaviour is the move away from a simply individualistic view (e.g., genetic effects, psychological effects and gender effects)³⁶ to taking into account wider social processes (Jaynes, 2014; Martin, 2019). As this theory was introduced, *where* individuals engage in (e.g., neighbourhood and community) was highlighted as an important factor in explaining their behaviours. This provides grounds to suggest policies to target at the area level to affect individual behaviour change, including antisocial behaviour.

Meanwhile, some researchers have argued that because social disorganisation theory has been mainly adopted and tested in the US, this theory may not be applicable to rural areas or contexts outside of America (Martin, 2019). Additionally, it has been maintained that this theory emphasises the internal dynamics of local areas and mostly overlooks the external influences which could have critical effects on the feature of the dynamics (Heitgerd and Bursik, 1987). Although modern ecological theories emphasise the role of inter-relationships in shaping community organisation (Bronfenbrenner, 1979; 1994), social disorganisation theory may give an impression that the neighbourhoods in urban areas are socially isolated (Heitgerd and Bursik, 1987). It has been also argued that the structural characteristics of neighbourhoods, which are suggested to promote social disorganisation (e.g., the poverty rate, high residential mobility, and ethnic heterogeneity) and the density of systemic relationships (e.g., family, friendship, and neighbourhood bonds), are not the only variables that explain differential crime rates (Mazerolle et al., 2010). Thus, building on earlier systemic theories (Mazerolle et al., 2010), Sampson and others began to argue that a community's ability to implement informal control and its collective capability for actions were closer mediators of structural disadvantage in regard to crime (Sampson et al., 1997; Wikström and Sampson, 2003).

In summing up, social disorganisation theory made various critical contributions in terms of explaining the effect of the neighbourhood conditions on human behaviours, including antisocial behaviour. This theory is useful as it provides a way to understand antisocial behaviour among young people beyond an individual and family level approach. The studies mainly focus on individual and family level factors in addressing antisocial behaviour, sometimes misuse their findings by claiming that a main determinant of antisocial behaviour is for example, the ill parenting in poor families which arises as a consequence of individual failings and personal weaknesses. Social disorganisation theory extends this limited view by

³⁶ See section 3.2 for detailed information on an individual level understanding on antisocial behaviour and crime.

providing the grounds to include wider social and environmental effects in understanding antisocial behaviour.

However, its application to rural areas or context outside of America is yet unclear (Bruinsma et al., 2013) and it needs to expand its consideration to the wider societal effects that surround the local communities. Moreover, at its early stage, this theory caused some confusion about what social disorganisation actually meant and how it should be measured, which made empirical testing of the model difficult (Bursik, 1988). However, this aspect of social disorganisation theory has been improved, as it was adopted and further expanded by later studies, including those leading to the development of social capital theory and the collective efficacy model.

4.2.2. Social Capital Theory

From the 1980s up to the early 2000s, researchers from sociology and social science conducted research on social capital, namely Bourdieu (1986), Coleman (1990) and Putnam (2000), influenced urban studies' scholars by developing explanatory frameworks for the association between social capital and the occurrence of social problems (Granovetter, 1973; Bruinsma et al., 2013). Broadly influenced by a social disorganisation perspective, these studies extended the perspective by incorporating the intervening process of social capital, which later influenced the development of Sampson et al.'s collective efficacy model (discussed later in section 4.2.3). These scholars viewed social ties as essential parts of social capital for individuals and communities. According to this theory, a community's social capital increases when high levels of "trust, reciprocity and formal networks between residents (e.g., civic engagement or organisational participation)" exist (Bruinsma et al., 2013, p.195).

Social capital theory posits that an increased crime rate is partly resulted from the continuous decrease of the traditional social ties and the duties that are derived from them. Putnam (2000) argued that decreases in social capital and civic engagement are causes and symptoms of social breakdown and impoverished democracy. Social capital is defined as the "*connections among individuals-social networks and the norms of reciprocity and trustworthiness that arise from them*" (Putnam, 2000, p.19). This definition highlights the networks and norms that enable residents in the same neighbourhood to act collectively, for example to reduce crime in the area. This capability of people in the same area to work collaboratively with local institutions and access extra-communal resources is influenced by local political and economic circumstances. In addition, the relationship with third persons, in particular official agencies and the media also take an important role in forming and shaping social capital in a local area.

Social capital is considered to work as a form of 'social glue' that promotes cohesion, order and integration.

According to social capital theory, social networks, shared values and a community commitment are held to be important for socialisation and the social life of young people and it is argued that a lack of social capital leads to outbreaks of antisocial behaviour or crime (Gatti, 2014). Social capital theory has been tested empirically by various researchers; an inverse correlation between social capital and the homicide rate was found by Putnam (2000); an association between violent, property crimes and indicators of low social capital was found by Kawachi et al. (1999); and an inverse association between area level high respect and trust (social capital) and crime was addressed by Rice and Sumberg (1997).³⁷ Depending on this theory, social capital is an area level factor that is considered as a collective good: social capital at the macro level means "shared norms and values that are beneficial for a community" and social capital at the micro level means "social relationships that are beneficial for the individual", including young people and children (Bruinsma et al., 2013, p.945).

4.2.3. The Collective Efficacy Model

Sampson and colleagues addressed how the social disorganisation mechanism actually operates through the collective efficacy model (Sampson et al., 1997; Sampson and Raudenbush, 1999; Morenoff et al., 2001; Sampson, 2006) and at the same time expanded Coleman's (1990) concept of social capital to explicate what constitutes and maintains collective efficacy for young children (Sampson et al., 1997). The model is unique, since it attempts to address the non-random distribution of antisocial behaviour across communities and why area level factors including deprivation and single parenthood are associated with crime (Bruinsma et al., 2013). This model tries to answer the question of which social procedures might explain or mediate the relation between neighbourhood structural factors, including a concentration of poverty and a high rate of residential mobility, and violence or criminal behaviours, especially among young people. Sampson (2006a, p.153) argues that:

Safety, clean environments, quality education for children, active maintenance of intergenerational ties, the reciprocal exchange of information and services among families, and the shared willingness to intervene on behalf of the neighborhood are capable of producing a social good that yields positive externalities of benefit to all residents—especially children.

³⁷ For more empirical research on the relationship between social capital and crime, see Gatti (2014) and Bruinsma et al. (2013).

The collective efficacy model was developed to help focus on social mechanisms in understanding neighbourhood influences on crime and moves away from a risk factor approach (Sampson, 2006a). In this regard, collective efficacy is considered to be a mediation factor between neighbourhood structural factors and criminal/offending behaviours. According to Sampson et al. (2002) collective efficacy is a combined measure of social cohesion and informal social control. Social cohesion refers to “mutual trust and shared expectations among residents” (Sampson et al., 2002, p.457) and informal social control reflects the “willingness to intervene on behalf of the common good” (Sampson et al., 1997, p.918) which are viewed to be linked to reduced violence and crime. In this model, concentrated neighbourhood structural disadvantages such as low economic status, a high rate of residential mobility and a high rate of ethnic heterogeneity operate as obstructions that hinder the formation of informal bonds to promote a willingness to take part in pursuing the common good of the local area.

The model also hypothesises that social control, which means the capability of communities to manage their residents according to the shared values and standards agreed among them, is a prior source that creates a neighbourhood variation in violent behaviours and crime. Even though social control is implemented to stop delinquent behaviour, it is unlike formal regulation by the formal institutions (e.g., police). It focuses more on the informal roles including monitoring group activities among teenagers and willing to intervene to stop public disturbances such as vandalism and public drinking by a group of adolescents or young people (Sampson et al., 1997). Collective efficacy functions through the desires of residents to dwell in orderly and safe areas that are safe from crime. However, an essential distinction that should be made is that collective efficacy is the capability of neighbourhoods to encourage formal and informal institutions to oversee children’s and other public behaviours but it does not necessarily refer to the accumulated local resources or social capital that forms via networks between residents (Leventhal and Brooks-Gunn, 2000).

The collective efficacy model is especially useful in explaining neighbourhood effects on antisocial behaviour among young people. Moreover, since problem behaviours among young people, including antisocial behaviour, are, in general, carried out in groups (Shaw and McKay, 1969), the mechanism of social control and a willingness to intervene for the common good of the residents can operate to reduce antisocial behaviour by monitoring and supervising the activities of young people. According to Leventhal and Brooks-Gunn (2000), who have provided a comprehensive review of the research on the effects of neighbourhood residence on the well-being of young people, the collective efficacy model is the most theoretically sound model to address the association between neighbourhood conditions and child outcomes.

Various neighbourhood level studies have demonstrated that neighbourhoods with low collective efficacy face a high level of social problems, especially crime related problems (e.g., Morenoff et al., 2001; Sampson and Wikstrom, 2008; Mazerolle et al., 2010; Maimon and Browning, 2010). The results from these studies show that there are negative associations between collective efficacy and a high level of deprivation, residential mobility and racial heterogeneity (Sampson et al., 1997) and that the socio-structural conditions of neighbourhoods also influence the collective efficacy of a neighbourhood (Sampson, 2012; Sampson et al., 1999).

Despite collective efficacy theory being supported by many empirical studies, as an important predictor of various neighbourhood level outcomes (Sampson, 2012), some critiques argue that there are some issues that need to be addressed in adopting collective efficacy models. Some researchers argue that it is difficult to measure informal social control. According to Hipp and Wo (2015, p.169), “informal social control activity is only on display in moments in which there are challenges to the social order”. Therefore, attempts in measuring the behaviour of informal social control is challenging since it occurs rarely which raises theoretical as well as methodological challenges (for measurement). Moreover, although collective efficacy is viewed as a combined measure of informal social control and social cohesion, questions have been raised about this strategy. Some researchers have argued that social cohesion and informal social control are unique concepts, and thus need to be modelled separately (Hipp and Wo, 2015). Some empirical studies on neighbourhood and criminal behaviours suggest that these might be distinctive concepts in some areas. For example, according to Horne (2004), the two measures do not necessarily show a high correlation and an increased level of social cohesion is not always linked with a high level of norm compliance. These critiques of this model assert that the conceptualisation and operationalisation of the model needs to be reorganised in order to adopt an explicit measure of collective efficacy (Gearhart, 2019).

In this section, three process theories of neighbourhood effects on people’s behaviour, namely social disorganisation theory, social capital theory and the collective efficacy model are presented. These models were introduced in order to explain how neighbourhoods influence young people’s lives, especially the antisocial behaviour among them. Shaw and McKay’s (1942) pioneering study on social disorganisation theory provides a useful perspective beyond the limited scope of psychology and genetic studies in understanding youth antisocial behaviour by highlighting the importance of neighbourhood effects. However, the greatest difficulty this theory faced was the challenges in identifying and measuring the social mechanisms that account for a raised crime rate in areas with a high level of social disorganisation (Kubrin and Wo, 2016). In other words, a primary conceptual limitation of

social disorganisation theory was that relatively less attention was made to the process that mediates the neighbourhood factors' effects (Byrne and Sampson, 1986; Kubrin and Wo, 2016).

However, since the 1980s, there has been renewed interest in the Chicago School's Community study, and social disorganisation theory has again been spotlighted and adopted by sociologists and criminologists, who have expanded the theory by posing new research questions and developing new models such as social capital and collective efficacy (Bruinsma et al., 2013). The social capital model extended original disorganisation perspectives by introducing the intervening process of social capital, which could be further defined with trust and social participation. The earlier theories were further expanded by Sampson's (2012) collective efficacy model, which not only expanded the perspective of social capital to explain what composes and maintains collective efficacy for children (Sampson et al., 1997), but also reduced the gap between the theory and the empirical model of social disorganisation. Although these neighbourhood process models are useful in explaining the association between different neighbourhood characteristics and antisocial behaviour among young people, each model has a distinct emphasis of its own. While social disorganisation theory puts more emphasis on structural characteristics, social capital theory focuses more on residents' perceptions of their own neighbourhoods. The collective efficacy model focuses on addressing social procedures that can explain or mediate the association between neighbourhood structural conditions and antisocial behaviour or crime by introducing collective efficacy.

Despite none of these theories offering a complete framework without limitations, the models contribute to studies on antisocial behaviour by providing a new scope of perspective that antisocial behaviour could be understood more thoroughly by exploring social circumstances, rather than being limited to psychological or genetic explanations of offending behaviour. These models are adopted as the theoretical framework of this study since they are useful in answering the research questions, which address whether neighbourhood level characteristics influence antisocial behaviour among young people and, if they do, the mechanisms behind the relationship between different characteristics of neighbourhoods and antisocial behaviour among young people. The neighbourhood level conditions (e.g., high rate of unemployment and single parent households) that are suggested to be risk factors of antisocial behaviour from these models are adopted in the measurement model of antisocial behaviour in this study.

4.3. Conclusion: Integrated understanding of antisocial behaviour

As Jaynes (2014) has argued contemporary policy debates often return to the basic question: with the scarce availability of resources to reduce antisocial behaviour, should the government target individual change (e.g., young people and their families), or wider neighbourhoods or population-wide changes? For instance, is it a better use of budgets to improve the structural conditions of a neighbourhood, for example by providing a source of recreation that is available to all children and young people, or would the budget be better spent on hiring youth workers to intervene with those young people identified as being at risk, antisocial, or delinquent? Regarding this question, social disorganisation theory and some neighbourhood studies prioritise the well-being of the community (Jaynes, 2014).

As discussed in Chapter 2, however, recent youth justice responses to the antisocial behaviour agenda draw largely on a risk factor approach, which responsabilises young people and their parents by undertaking more intensive risk management via individualised 'offender' and offence-based interventions (Johns et al., 2017). Although the antisocial behaviour agenda has become one of the biggest issues in the UK since the 1990s – albeit, it has been more recently replaced by concerns about knife crime - efforts in understanding rather than controlling young people's antisocial behaviour are still scarce. Youth crime, especially antisocial behaviour, has been decoupled from its broader social context (France et al., 2012). Recent youth and criminal justice approaches have been characterised as making less focus on the environmental context of crime and more on the responsibilities of individuals, families and neighbourhoods (Muncie, 2005; Smith and Osborn, 2003; France et al., 2012).

Meanwhile, numerous studies have tried to understand antisocial behaviour among young people by empirically testing individual, family and neighbourhood level factor effects on antisocial behaviour (reviewed in Chapter 3). While the individual and family level factors that present the most direct effect are arguably the most essential predictors of antisocial behaviour, the large body of studies reviewed here show that young people's lives are also influenced by where they live (Kohen et al., 2008; Oberwittler, 2004; Winslow and Shaw, 2007). Trying to understand or explain antisocial behaviour by simply considering one or two risk factors, or considering one level of risk factors, is limited. Individual, family and neighbourhood level factors are interconnected in influencing antisocial behaviour, and thus they need to be considered together in explaining antisocial behaviour.

The aim of this chapter was to introduce the theoretical frameworks that help to enable an overall understanding of antisocial behaviour trajectories among young people. Since this study aims to empirically test the interrelated relationship between antisocial behaviour and

different levels of risk factors, the social ecological theory (Bronfenbrenner, 1979) provides a useful view. It states that young people's behaviours, including antisocial behaviour, are widely influenced by their interactions with the immediate and wider environment, and that the different areas/types of effects are interconnected, leading to direct and indirect influences (Heilmann, 2013). In addition, process models of neighbourhoods, namely social disorganisation theory, social capital theory and the collective efficacy model, are adopted in this study, since they provide a unique view that explains how neighbourhood conditions influence the occurrence of antisocial behaviour. These neighbourhood process models are useful in answering the research questions of this study, since they inform how these neighbourhood level characteristics interact with and mediate the influences of individual and family level characteristics.

Reviews of these frameworks lead to the conclusion that no single theory or model can completely explain antisocial behaviour among young people without limitations. These frameworks are, however, useful in explaining young people's antisocial behaviours beyond individual level risk factor approaches. They consider not only their immediate individual and family level influences but also the broader effects of schools, neighbourhoods, and social and political environments. Moreover, they also consider the interactions between different spheres (Johns et al., 2017; France et al., 2012; Bronfenbrenner, 1981; Kim, 2004). Thus, in understanding antisocial behaviour among young people, this study adopts the social ecological theory and the neighbourhood process model to inform the research design, which is presented in Chapter 5.

Chapter 5. Methods and Data

This chapter introduces the methods adopted and the data used in this study. As the method of this study is a secondary data analysis, this chapter is largely concerned with the suitability of the dataset chosen for the study and the potential limitations based on the contents of the dataset. The statistical analysis methods adopted to measure the complex relationship between individual, family and neighbourhood level effects on antisocial behaviour among young people are also introduced in this chapter.

The main research questions of this study are provided in section 5.1. In the subsequent section, the secondary datasets that are used in this study are introduced. The research design of the Millennium Cohort Study (MCS) and the main research questions are introduced, together with the strengths and weaknesses of the survey method in relation to the objective of the study and the research questions. The description of the MCS is followed by an introduction to the supplementary data, 2011 Census Data. The supplementary data are used to derive the neighbourhood structural variables, which are matched and combined with the MCS using geographical identifiers. Section 5.3 introduces the measurement models adopted, and the operational definition of the dependent and independent variables is also presented. In section 5.4, the research design of this study is introduced. In section 5.5, the multilevel models utilised to test the complicated relationships between independent and dependent variables are described. Section 5.6 introduces the ethical considerations that are relevant in conducting this secondary data analysis. Some issues and limitations of the methods and their implementation are addressed at the end.

5.1. Research Questions

This study aims to investigate individual, family and neighbourhood effects on antisocial behaviour among young people. Given the existing state of knowledge reviewed in Chapters 3 and 4, the key priorities for further research include addressing the following research questions.

“What impact do individual, family and neighbourhood level characteristics have on antisocial behaviour among young people?”

Question 1-1: What are the individual and family level risk factors that are associated with antisocial behaviour among young people?

Question 1-2: What interactions are there between individual and family level factors in predicting antisocial behaviour?

Question 2-1: Does the likelihood of antisocial behaviour among young people vary across different neighbourhoods while individual and family level characteristics are held constant?

Question 2-2: If so, what are the neighbourhood characteristics that are associated with the neighbourhood level variation in antisocial behaviour among young people?

Question 3-1: Are there neighbourhood level variations in the individual and family level factors' effects on antisocial behaviour among young people?

Question 3-2: If so, what are the neighbourhood level characteristics that significantly explain the variation in the effects of individual and family level characteristics on antisocial behaviour across different neighbourhoods?

Research question 1 addresses the individual and family level (level-1) factors that significantly predict antisocial behaviour among young people, and the interactions between them. Research question 1 is tested by multivariate multinomial logistic and Poisson regression models. The results will be compared with previous findings on the relationship between level-1 characteristics and antisocial behaviour among young people (Bank et al., 2004; Hoeve et al., 2012; Johnson, 2015; Moffitt, 2001).

Research question 2 addresses whether the prevalence of antisocial behaviour varies from one neighbourhood to another. It also addresses neighbourhood level predictors that significantly explain antisocial behaviour, over and above the effects of the level-1 risk factors. Research question 2 is tested by a series of multilevel multinomial logistic and Poisson regression models. The results are then compared with previous research on the relationships between neighbourhood factors and antisocial behaviour among young people (Bruce, 2004; Leventhal and Brooks-Gunn, 2000; Shaw and Mackay, 1942; Sampson et al., 1997; Sampson and Groves, 1989; Beyers et al., 2001; Loeber et al., 1998; Herrenkohl et al., 2000).

Research question 3 examines the interactions between neighbourhood level predictors and level-1 predictors. The results will reveal whether some individual and family level risk factors' effects on antisocial behaviour vary across neighbourhoods.

5.2. Data

This research adopts a quantitative approach and uses secondary data to address the research question.³⁸ Although qualitative studies could report young people's own understanding of antisocial behaviour in connection with individual, family and neighbourhood effects, they have limited representativeness and no objectively verifiable result (Choy, 2014). By adopting secondary data methods, this study has several advantages (Boslaugh, 2007; Heaton, 1998). First, using secondary data is economical. Since the data are collected by someone else, the researcher saves resources, mainly time and cost (Thompson, 2017). Secondary data also allow a researcher to use nationally representative large sample data, which are useful in policy studies as the research results could inform policy makers on a national basis. Moreover, the original data collection process is often advised on by professionals and experts, and this advice may not be available to individual researchers or small research projects (Boslaugh, 2007).

There are also a few limitations in using secondary data analysis (Whiteside et al., 2012). Particular information that a researcher might need may not have been collected, since the data are not collected to address the researcher's specific research questions. In addition, since the researcher did not plan or conduct the data collection, he/she does not know exactly how it was done (Heaton, 1998). To compensate for these limitations, this study made a comparison of the available datasets concerning young people and their behaviour to choose the most appropriate dataset to answer the research questions. (See Appendix 5.1 for further details on the comparison of the relevant datasets.)

5.2.1. Data: The Millennium Cohort Study

This is a secondary data analysis study, which uses the sixth sweep of the Millennium Cohort Study (MCS). The MCS was selected for this study for the following reasons, after making a comparison of the relevant datasets in the UK that concern young people's behaviours. First, it offers some neighbourhood level variables that could be readily used in this study. Second, compared to the other datasets reviewed in Appendix 5.1, the MCS has the biggest sample size, which is an important issue when conducting multilevel modelling that assumes sufficient individuals within each group (Hox, 2010). Third, the MCS's field of enquiry covers diverse topics in regard to the characteristics of children and their parents as well as family background. It includes variables that are considered to be linked with antisocial behaviour by previous

³⁸ The limitations and advantages of adopting a quantitative and secondary data analysis approach to this study are further addressed in the discussion chapter (Chapter 9).

empirical studies, which could therefore be used as covariates in this study. Mostly importantly, the MCS also provides information on antisocial behaviour, the dependent variable and neighbourhood perception variable (Washbrook, 2010). Fourth, the MCS is a nationwide study, which made it possible for this study to select the target sample of England and Wales. Finally, since antisocial behaviour studies considering neighbourhood effects mostly thrived in the 1990s (Lupton, 2003), researching this topic with data about young people in the twenty-first century, available from the most recent sweep, will contribute to filling this gap in the existing research literature on antisocial behaviour.³⁹

Although the MCS is a longitudinal study, this study conducts a cross-sectional study using sixth sweep, since some important independent variables (e.g., a victim of antisocial behaviour, friends with school trouble and low parental supervision) are not available from the previous sweeps. Also, although the MCS is a nationwide study, this study is restricted to England and Wales, since different countries in the UK have different policy systems when it comes to criminal justice (Garside, 2015) and, therefore, area effects on young people from England and Wales, Scotland, and Northern Ireland need to be studied separately.⁴⁰ Information about the MCS is restricted to England and Wales, except where it is specifically stated otherwise. The MCS is a representative survey of approximately 19,000 children born in the UK during the period 2000 - 2001 (Violato et al., 2011).⁴¹ Seven surveys have been carried out: when the children were aged 9 months, and then at 3, 5, 7, 11, 14 and 16 years old. The detailed information on the MCS is well described in the MCS user guide (Fitzsimons, 2017) and technical report (Ipsos MORI, 2016) which is summarised in Figure 5.1 below.

The use of the MCS results in two main limitations of this study. Some of the neighbourhood perception indicators that were originally used in the collective efficacy model (Sampson et al., 2002) are not available in the MCS. Therefore, the results of this study can only partially corroborate the collective efficacy model. In addition, this study uses the MCS6, when the respondents were 14 years old.⁴² Although most antisocial behaviour including fighting, stealing and vandalism are perpetrated from early adolescence, certain types of antisocial behaviour such as the use of illegal drugs tend to manifest during mid or late adolescence (at 15-18 years) (McAtamney and Morgan, 2009). Therefore, the result of this study can only explain neighbourhood effects on antisocial behaviour among young people at age 14. To

³⁹ The sixth sweep of the MCS was the latest available data when it was chosen to be used for this study in 2016/17.

⁴⁰ The Justice Secretary and Home Secretary in the UK government only have responsibility for criminal justice in England and Wales, with a few essential exceptions.

⁴¹ The sample size for England and Wales, which is the target sample of this study, was 14,790 in the first wave.

⁴² The MCS6 was the latest sweep of the MCS when it was selected for this study in 2016-7.

discuss the long-term effects of neighbourhood factors on antisocial behaviour, further research including various age groups of young people is required.

Figure 5.1 Information on the data: Millennium Cohort Study

The information on the MCS provided in this figure is mostly direct quotes from the MCS User Guide (Fitzsimons, 2017) and Technical Report (Ipsos MORI, 2016).

The MCS is “the most recent of UK’s world-renowned national longitudinal birth cohort studies. It collects information from children, their parents and, in two of the sweeps, their older siblings. The MCS provides a variety of topics including parenting; childcare; schooling and education; children’s behaviours; child and parent health; employment and education; income and poverty; housing, neighbourhood and residential mobility; and social capital, ethnicity and identity” (Fitzsimons, 2017, p.6).

The original MCS sample covers children from all four countries of the UK who were eligible for child benefit and were 9 months old at the time of the first wave. It used a stratified, clustered random sample design and oversampled from areas that were disadvantaged or had high ethnic minority populations. This was to facilitate a robust study of the impacts of disadvantages on children, and an analysis of different ethnic groups. The sample was randomly selected within each of two or three strata in each country, producing a disproportionately stratified cluster sample, which means that the sample is not self-weighting, and so weighted estimates of means, variance and so forth are needed” (Fitzsimons, 2017, p.6-7).

In the sixth sweep of the Millennium Cohort Study (MCS6), non-response weights were constructed as the inverse of the predicted probabilities. This study uses an “overall weight’ variable for the MCS6, which is constructed by multiplying the sampling weights in MCS1 by the attrition weights in MCS6. The overall weight adjusts for both sampling and attrition and it is re-scaled to make its total equal to the productive sample size. The overall weight for MCS6 is used throughout the data analysis except where it is stated otherwise” (Fitzsimons, 2017, p.51-52).

The final issued sample of England and Wales for MCS6 is 9,347 households (Mostafa and Ploubidis, 2017). Based on the productive numbers of responses for the sixth sweep, the response rate of sweep 6 was 89% (see Appendix 5.2 for more information).

5.2.2. Supplementary Data

The neighbourhood structural variables that are not available from the MCS, such as neighbourhood level ethnic minority status and single-parent household, are derived from 2011 census data (explained further in section 5.3). Neighbourhood level information from the supplementary data is matched and combined with the MCS using the geographical identifier, Lower Layer Super Output Area (LSOA), which is included in both the MCS and 2011 Census Data.

LSOA is a “geographic hierarchy designed to improve the reporting of small area statistics in England and Wales. LSOAs are built from groups of contiguous Output Areas and have been automatically generated to be as consistent in population size as possible” (NHS Data Model and Dictionary, 2019, p.1): they are designed to have social homogeneity, and generally contain from four to six Output Areas.⁴³ The Minimum population is “1000 and the mean is

⁴³ For more information on the design of the LSOA, please refer to the Office for National Statistics (2012).

1500. There is a LSOA for each postcode in England and Wales” (NHS Data Model and Dictionary, 2019, p.1).

5.3. Variables and Measurements

In this section, the dependent and explanatory variables selected for the antisocial behaviour model of this study are presented. The operational definitions of the variables derived from the MCS, and 2011 Census data are introduced. In measuring the independent variables, in some cases, a set of items, rather than a single item from the MCS data are used. In this case, classical reliability theory (Cronbach`s alpha) is used to examine “the internal consistency to see how closely related a set of items are as a group” (UCLA, 2020, p.1).

The items that make a negative contribution to the alpha coefficient are excluded from the scale. This process is adopted since it creates a scale that utilises ‘all items relevant to the construct of interest’ (Kim, 2004, p.66). This method is used throughout this research except where it is specifically stated otherwise. The development of a validated antisocial behaviour measure is introduced in Chapter 6.

5.3.1. Dependent Variable

In the MCS data, antisocial behaviour is measured by the section asking about things young people may have done. Thirteen questions (Victimisation and Risky Behaviours module, sweep VI), which concern respondents’ antisocial behaviour, are used. Each question addresses a different type of antisocial behaviour, as presented in Table 5.1 below.

The antisocial behaviour variable is created by aggregating all thirteen indicators of antisocial behaviour, which were originally coded as 1 “yes” and 2 “no” except one question, “are you a member of a street gang?” which has three categories of “yes”, “no” and “I used to be a member but am not anymore” but recoded into two categories as other indicators.⁴⁴ These thirteen indicators are recoded as 0 “no” and 1 “yes” and aggregated to construct an antisocial behaviour variable, which is treated as count data that ranges between zero and thirteen. Table 5.1 shows the prevalence of the MCS respondents, living in England and Wales, perpetrating antisocial behaviour in the last 12 months at age 14. Based on these results, more than thirty percent of young people (31.6%) had shoved or punched someone and over thirteen percent of the young people (13.8%) had been complained about for being rude or

⁴⁴ The category of “I used to be a member but am not anymore” was recoded as “yes” so that this indicator could make a balance with other indicators of the antisocial behaviour variable.

noisy in a public place, while less than one percent said that they had entered someone's home to steal or damage (0.2%).

Table 5.1 Prevalence of antisocial behaviour amongst young people at age 14 in England and Wales

Indicators	Questions	%	N
Hitting someone ^a	Have you pushed or shoved/hit/slapped/ punched someone?	31.6	3,103
Police questioning ^b	Have you ever been stopped and questioned by the police?	15.5	1,524
Rude/noisy in public ^a	Have you been noisy or rude in a public place so that people complained or got you into trouble?	13.8	1,357
Police formal caution ^b	Have you ever been given a formal warning or caution by a police officer?	8.8	862
Street gang ^c	Are you a member of a street gang?	3.8	370
Shoplifting ^a	Have you taken something from a shop without paying for it?	3.6	357
Vandalism ^a	Have you on purpose damaged anything in a public place that didn't belong to you, for example by burning, smashing or breaking things like cars, bus shelters and rubbish bins?	3.5	341
Carrying a weapon ^b	Have you ever carried a knife or other weapon for your own protection because someone else asked you to or in case you get into a fight?	2.9	283
Graffiti ^a	Have you written things or spray painted on a building, fence or train or anywhere else where you shouldn't have?	2.7	263
Being arrested ^b	Have you ever been arrested by a police officer and taken to a police station?	1.2	122
Stealing ^a	Have you stolen something from someone, e.g., a mobile phone, money etc.?	1.2	120
Using a weapon ^a	Have you used or hit someone with a weapon?	1.1	108
Robbery ^b	Have you ever gone into someone's home without their permission because you wanted to steal or damage something?	0.2	17

Note: Responses refer to a 'last 12 months'; b 'the lifetime experience'; c 'present status'

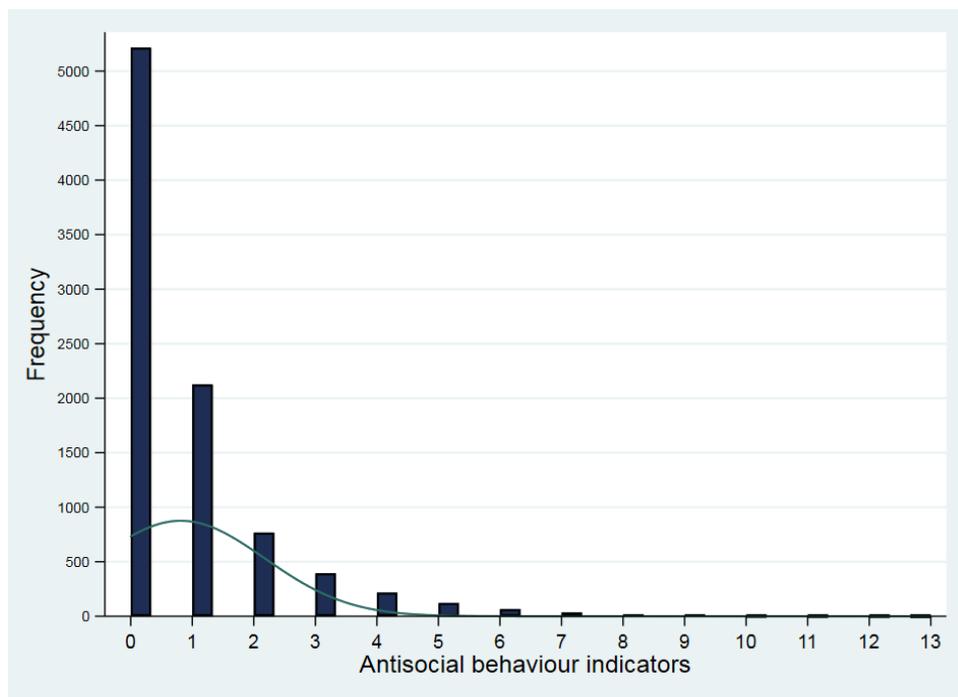
Source: MCS Sweep 6 (author's analysis, weighted data)

In measuring antisocial behaviour, this study includes three indicators that are related to police contact/arrest. There are some concerns about using police contacts in measuring youth ASB/crime as they may reflect police bias towards certain population groups/localities rather than ASB (Farrington, 2005). However, reported police contact has long been used by delinquency/ASB researchers, as it is a useful source to capture antisocial behaviour, especially to capture severe forms of antisocial behaviour (Rutter et al., 1998). In addition, although this study includes a variety of indicators of ASB, they do not capture all of the aspects of antisocial behaviour, which could be further supplemented by including police

contact. Thus, regardless of the limitations, police contacts are useful indicators in measuring ASB (Bendixen and Olweus, 1999, Rutter et al., 1998).

A number of previous studies have included police contact (e.g., police questioning, caution and arrest) when measuring antisocial behaviour and juvenile delinquency (see for example, DeLisi et al., 2009; Moffitt, 1993; Bagwell, 2004; Dishion et al., 1995; Schoenmacker et al., 2020; Smart et al., 2004; White et al., 1990). In measuring antisocial behaviour, some studies have used a similar approach to this study by including both police contact and self-reported measures of antisocial behaviour. For example, in Emerson's (2013) study, the antisocial behaviour index included both self-reported behaviours (e.g., graffiti) as well as parent-reported police contact. Williams and McGee (1994) also used self-reported police contact as a measure of juvenile delinquency. In their study, police contact included police taking the adolescent's or parent's name and address, arrest, or a court appearance. Moffitt (1993) also viewed police contact as a measure of antisocial behaviour. In her study on adolescence limited and life course persistent antisocial behaviour, Moffitt (1993) reviewed studies that measured antisocial behaviour using official police arrest records and other police contact, including White et al. (1990). A study of Bendixen and Olweus (1999) on the measurement of adolescent ASB stated that there is a positive relationship between police arrest and adolescent antisocial behaviour.

Figure 5.2 Cumulative distribution of prevalence of antisocial behaviour in total amongst young people at age 14



Source: Sixth survey of the MCS (author's analysis; weighted)

Since the antisocial behaviour variable is created by aggregating a list of items that are deemed to measure antisocial behaviour, to develop a robust antisocial behaviour index, the validity and reliability of the index needs to be tested. After testing for the validity and reliability of the index, 10 indicators are left in constructing an antisocial behaviour index. The antisocial behaviour index is used to make two types of dependent variable: a count antisocial behaviour variable, ranging between 0 and 10; and a categorical antisocial behaviour variable, grouped into three categories ('never tried any', 'minor forms of antisocial behaviour' and 'severe forms of antisocial behaviour'). The process of testing the validity and reliability of the antisocial behaviour index and the construction of the resultant index is presented in Chapter 6.

5.3.2. Independent Variables

This section introduces the explanatory variables selected for this study. The explanatory variables utilised for this study are measured at the respondent (individual and family) and neighbourhood levels. The respondent level variables, namely behavioural and socio-demographic characteristics, are operationalised based on the MCS6 data. The neighbourhood level structural variables are derived from supplementary data, 2011 Census data, and neighbourhood perceptions are operationalised using the MCS6 data.

Individual and Family Level Variables

Various factors are identified as being significantly related to antisocial behaviour based on the review of the empirical evidence on antisocial behaviour presented in Chapter 3. These include behavioural factors, such as impulsivity (Romero et al., 2001; Jolliffe and Farrington, 2007); use of illegal drugs (Johnston et al., 1993); school bond (Le Blanc et al., 1992; Le Blanc, 1994); peer influence (Eamon, 2002; Steinberg, 2000); delinquent peer group effects (Henry et al., 2001; Jaffee et al., 2012); being a victim of ASB (Phillips and Chamberlain, 2006); and poor parenting (Sampson, 1994; Collishaw et al., 2012). They also include some socio-demographic factors, including gender differences (Hoeve et al., 2012; Jacobson et al., 2002); ethnicity (Henry et al., 2001); poverty or economic hardship (Dubow and Ippolito, 1994; Eamon, 2002; McLeod et al., 1994); and family structure, including non-intact families (Apel and Kaukinen, 2008) and single parenthood (Anderson, 2002; Amato and Keith, 1991).

These individual and family level independent variables are constructed from the MCS6 and a short description of each variable is provided below in Figure 5.3. Detailed information on the measurement model for each level of explanatory variables is provided in Appendix Table A 1 (in Appendix Chapter 5).

Neighbourhood Level Variables

Social disorganisation theory hypothesises that there is a direct connection between different rates of delinquency and offenders and certain conditions in local areas such as economic status, adult crime rate, residential heterogeneity, rate of single parenthood and ethnic diversity (Leventhal and Brooks-Gunn, 2000; Shaw and McKay, 1969; Kim, 2004). Some neighbourhood studies use composite measures of neighbourhood deprivation that include a mixture of the following measures: “mean or median family income, the mean education of one or both parents, some measure of occupational mix, the percentage of families with female heads, and the percentage on welfare” (Jencks and Mayer, 1990, p.125). However, combined measures make it impossible to identify which particular neighbourhood characteristics have significant effects on individuals, and which do not. This is critical in determining, for example, whether the rate of antisocial behaviour among young people decreases when they reside in black neighbourhoods with high SES or only when their family reside in predominantly white neighbourhoods. This study thus uses a number of neighbourhood level characteristics separately, rather than composite measures of neighbourhood disadvantage.

Figure 5.3 Individual and family level variables and their construction

The information on the variables provided in this figure is mostly direct quotes from the MCS6 Parent Questionnaire and MCS6 Young Person Questionnaire.

Gender: Response categories for gender was: “male” and “female”.

Ethnic minority: One question on respondent’s ethnicity is used to construct ethnic minority variable which is: “What is your ethnic group?”. Response categories for the above question are: “White,” “Mixed,” “Indian,” “Pakistani and Bangladeshi,” “Black or Black British,” and “other” which are recoded to “Black and Mixed ethnic group”.

Low household income: OECD equivalised income quintiles by country variable that is derived by the MCS is used to measure low household income. The variable is originally coded as “bottom quintile” 1, “second quintile” 2, “third quintile” 3, “fourth quintile” 4, and “top quintile” 5 which is recoded as “top quintile” 1 to “bottom quintile” 5 to construct low household income variable.

Social housing: One question asking about the respondent’s housing tenancy status is used to construct this measure which is “Do you (or your husband/wife/partner) own or rent your home or have some other arrangement?”. Response categories for the above question are: “own outright,” “own-mortgage/loan,” “part rent/ part mortgage,” “rent from local authority,” “rent from housing association,” “rent privately,” “living with parents,” “living rent free,” and “other” which are recoded to “Social housing” and “Others”.

Single-parent household: Household composition variable derived by the MCS is used to construct a single-parent household variable. Response categories for household composition variable are twenty which is recoded to “a single-parent household” and “Others”.

Illegal drugs: One question is used to measure the respondent’s experience of using illegal drugs which is: “How many times have you used or smoked cannabis (also known as weed, marijuana, dope, hash or skunk)?”. Response categories for the above question are: “not applicable,” “once or twice,” “three or four

times,” “five to ten times,” and “more than ten times.” Since “not applicable” means they have not smoked cannabis, it is changed to “never.”

A victim of antisocial behaviour: Five questions asking about victimisation experience of antisocial behaviour are used to construct this measure. The respondent is asked whether anyone has done any of the below things to him/her in the past 12 months. They include: “Insulted you, called you names, threatened or shouted at you in a public place, at school or anywhere else”; “Been physically violent towards you, e.g., pushed, shoved, hit, slapped or punched you”; “Hit you with or used a weapon against you”; “Stolen something from you. e.g., a mobile phone, money etc.”; and “Made an unwelcome sexual approach to you or assaulted you sexually”. These items are aggregated to construct a victim of antisocial behaviour variable which ranges between 0 and 5.

Risk taking: The MCS used Cambridge Gambling Task (Cambridge Gambling Task, Measurements of Risk taking)⁴⁵ to derive risk taking behaviour variable. The score of the risk taking ranges between .05 and .95.

Low bonding to school: Seven questions asking about how the respondent feels about school are used to construct this measure. They include: “How often do you try your best at school?”; “How often do you find school interesting?”; “How often do you feel unhappy at school?”; “How often do you get tired at school?”; “How often do you feel school is a waste of time?”; “How often do you find it difficult to keep your mind on your work at school?”; and “How often do you misbehave or cause trouble in lessons?” All the questions asked respondents to choose among the frequency categories: “all of the time,” “most of the time,” “some of the time,” and “never.” By aggregating the seven items, low bond with school is treated as a continuous variable which ranges between zero and twenty-one.

Drug taking friends: One question is used to measure if the respondent has friends who take illegal drugs which is “Do any of your friends take cannabis (weed) or any other illegal drugs?”. This question asked the respondent to choose among the frequency categories: “none of them,” “some of them,” “most of them,” and “all of them.”

Friends with school trouble: One question is asked to measure if the respondent has friends who get into trouble at school which is “How many of your close friends get into a lot of trouble at school?”. This question asked the respondent to choose among the frequency categories: “none of them,” “some of them,” “most of them,” and “all of them.”

Low parental supervision: Three questions are asked to measure parental supervision. They include: “When you go out, how often do your parents know where you are going?”; “When you go out, how often do your parents know who you are going out with?”; and “When you go out, how often do your parents know what you are doing?”. This question asked the respondent to choose among the frequency categories: “always,” “usually,” “sometimes,” and “never”. The score of the low parental supervision ranges from zero and nine.

Since neighbourhood structural data are not available from the MCS, they are derived using 2011 census data. Both the MCS and 2011 Census Data provide a geographical identifier (LSOA code), which enabled this study to match the two datasets and to incorporate neighbourhood structural characteristics in the MCS analysis. The neighbourhood structural variables that are included in this study are as follows: ethnic minority status; single-parent household; low level occupation; unemployment; own outright; housing deprivation (shared

⁴⁵ The sixth sweep of the Millennium Cohort Study asked the cohort to complete two cognitive tests drawn from the Cambridge Neuropsychological Test Automated Battery (CANTAB). Two tests from the CANTAB battery were administered – the Spatial Working Memory task (SWM) and Cambridge Gambling Task (for more information see <http://www.cambridgecognition.com/cantab/cognitive-tests/executive-function/cambridge-gambling-task-cgt/>)

accommodation; no-central heating); and health deprivation (bad health). They are further described in Table 5.2 below.

These neighbourhood level factors are included as neighbourhood level explanatory variables as they are suggested by social disorganisation theory and collective efficacy model to be predictors of juvenile delinquency/antisocial behaviour (Shaw and McKay, 1969; Sampson et al., 1997; Sampson and Raudenbush, 1999; Morenoff et al., 2001; Sampson, 2006). Social disorganisation and collective efficacy model posit that in deprived areas with high volumes of crime, a wide diversity in standards (occurred by having e.g., ethnic diversity and diversity in family type) and rules of behaviour exist, which lead to reduced social cohesion and a lack of informal social control, which in turn let juvenile delinquency occur more easily (Shaw and McKay, 1969; Sampson et al., 1997) (see section 4.2 for more information). In this study, several variables are included to capture neighbourhood level material deprivation, namely low level occupation, unemployment, own outright, housing deprivation and health deprivation, and other variables are included to reflect area level diversity, including ethnic minority status and single-parent household.

Some other neighbourhood level factors that are suggested to be important predictors of antisocial behaviour such as crime rate and residential mobility (Shaw and McKay 1969) or that can capture neighbourhood disadvantage such as over-crowding and population density are not included in this study because some of them do not provide LSOA level information, some are not available from the 2011 Census data, and some do not provide sufficient information to create certain variables (e.g., residential mobility). The LSOA level migration data is available from the 2011 Census, which provides information on the number of people who didn't live at the same communal establishment one year before. This study did not include this data as one of the neighbourhood level predictors since the number of people who lived somewhere else one year before is not considered to sufficiently capture residential mobility, which is used in social disorganisation theory (Shaw and McKay, 1964).

As discussed in Chapter 4, the collective efficacy model explains the connection between behavioural outcomes among young people and neighbourhood perceptions of social connectedness, informal social control, and mutual trust (Sampson et al., 2002; Sampson 2006a). Neighbourhood perception reflects the conditions of the neighbourhood as perceived by residents, for example, whether residents feel safe in their neighbourhood or whether they are willing to stop children in their neighbourhood when they are doing something dangerous in the street. Since the neighbourhood perception variables that were originally used in the collective efficacy model (Sampson et al., 2002) are not included in the MCS, this study uses the unsafe neighbourhood variable, which is based on the perceptions of the participants.

Neighbourhood safety has been studied in relation to child outcomes (see for example, Pettit et al., 1999; Mullan, 2012) and family outcomes (see for example, Benzies and Mychasiuk, 2009; Snell-Johns et al., 2004), but has not been directly tested for its effects on antisocial behaviour among young people.

One question is asked to measure the safety of the respondent's neighbourhood: "How safe is it to walk, play or hang out in this area during the day (By this area we mean within about a mile or 20-minute walk from your home)?" from among the following categories: very safe, safe, not very safe and not at all safe. The neighbourhood level unsafe variable is created by measuring the mean value of the individual level unsafe variable by LOSAs.

By using the perceived neighbourhood safety variable, this study expands the understanding of antisocial behaviour rather than limiting its understanding to only the effects of neighbourhood structural factors. However, since what we are using is perceived neighbourhood safety (the mean value of the individual level safety variable by neighbourhood), which is based on young people's reports, it may not reflect the actual neighbourhood condition of safety (Pettit, 2003). Since perceived neighbourhood safety is self-reported and subjective, it needs to be distinguished from actual safety (He et al., 2020) and the result needs to be interpreted with caution. Also, it should be noted that there are other factors that may affect how individuals feel about the safety of their neighbourhood (e.g., level of anxiety, experience of victimisation, and other neighbourhood physical conditions) (Echazarra, 2012).

There are also strengths in using the perceived neighbourhood safety variable. As the collective efficacy model (Sampson et al., 1997) argues, how residents view their own community plays an important role in understanding the relationship between antisocial behaviour and neighbourhood. Residents' willingness to intervene on behalf of the neighbourhood could also be affected by how they feel about their neighbourhood. In other words, if residents feel unsafe in their residential area, they will be less likely to go out and involve themselves more actively, which in turn will reduce the adult involvement with young people's behaviours including antisocial behaviour.

Table 5.2 shows the summary information on the measurement model for the dependent variable and each level of explanatory variables. More information on the wording of the questions and the construction of each level of variables is provided in Appendix Table A 1 (in Appendix Chapter 5).

Table 5.2 Summary of the measurement model for the dependent and independent variables

Variable	Description/Response	Data
Dependent Variables		
<i>Antisocial behaviour</i>	Ranges between 0-10	MCS6
<i>Severe antisocial behaviour</i>	Never tried any Minor ASB (1+) Severe ASB (1+)	
Individual & Family Level Explanatory Variables		
Socio-demographic Factors		MCS6
<i>Gender</i>	Male/Female	
<i>Ethnic minority status</i>	White/Others	
<i>Social housing</i>	Social housing	
	Own outright & Private rent	
<i>Low household income</i>	OECD equivalised income quintiles	
<i>Single-parent household</i>	Single-parent household Other types	
Behavioural Factors		
<i>Illegal drugs</i>	Never 1 to 2 times > 3 times	
<i>Risk taking</i>	Ranges between .05-.95	
<i>Victim of ASB</i>	Never 1 type 2 types > 3 types	
<i>Low bond with school</i>	Ranges between 0-21	
<i>Drug taking friends</i>	None of them	
	Some of them	
<i>Friends with school trouble</i>	Most or all of them	
<i>Low parental supervision</i>	Ranges between 0-9	
Neighbourhood Level Explanatory Variables		
Structural factors		2011 Census Data
<i>Ethnic minority status</i>	Rate of Black, Black British & Mixed ethnic population	
<i>Single-parent household</i>	Rate of single-parent headed households	
<i>Low level occupation</i>	Rate of lower supervisory & technical occupations, Semi-routine & routine occupations, routine occupations and unemployed population	
<i>Unemployment</i>	Rate of long-term unemployed and never-worked population	
<i>Own outright</i>	Rate of households with own housing outright	
<i>Shared accommodation</i>	Rate of households with shared dwelling	
<i>No-central heating</i>	Rate of households without central heating	
<i>Bad health condition</i>	Rate of people with bad & very bad health conditions	
Perception factor		
<i>Unsafe neighbourhood</i>	Not safe Safe	MCS6

Source: Sixth survey of the MCS (author's analysis, weighted data); 2011 Census Data

5.4. Research Design

This section introduces the research model of this study, which is based on the existing state of knowledge reviewed in Chapter 4. Informed by social ecological theory and neighbourhood models (e.g., social disorganisation theory (Shaw and Mackay, 1942) and collective efficacy models (Sampson et al., 1999)), this study hypothesises that antisocial behaviour among young people could be better explained by considering not only individual and family level effects but also the broader effects of the neighbourhood and their inter-relationships. More specifically, this study hypothesises that the prevalence of antisocial behaviour varies from one neighbourhood to another and that neighbourhood level risk factors significantly predict antisocial behaviour among young people, even after controlling for individual and family level predictors. In summary, this study aims to disentangle the complex relations between antisocial behaviour and individual, family and area level factors and further address their inter-connected effects on antisocial behaviour among young people, as illustrated in Figure 5.4 below.

Figure 5.4 Research Model

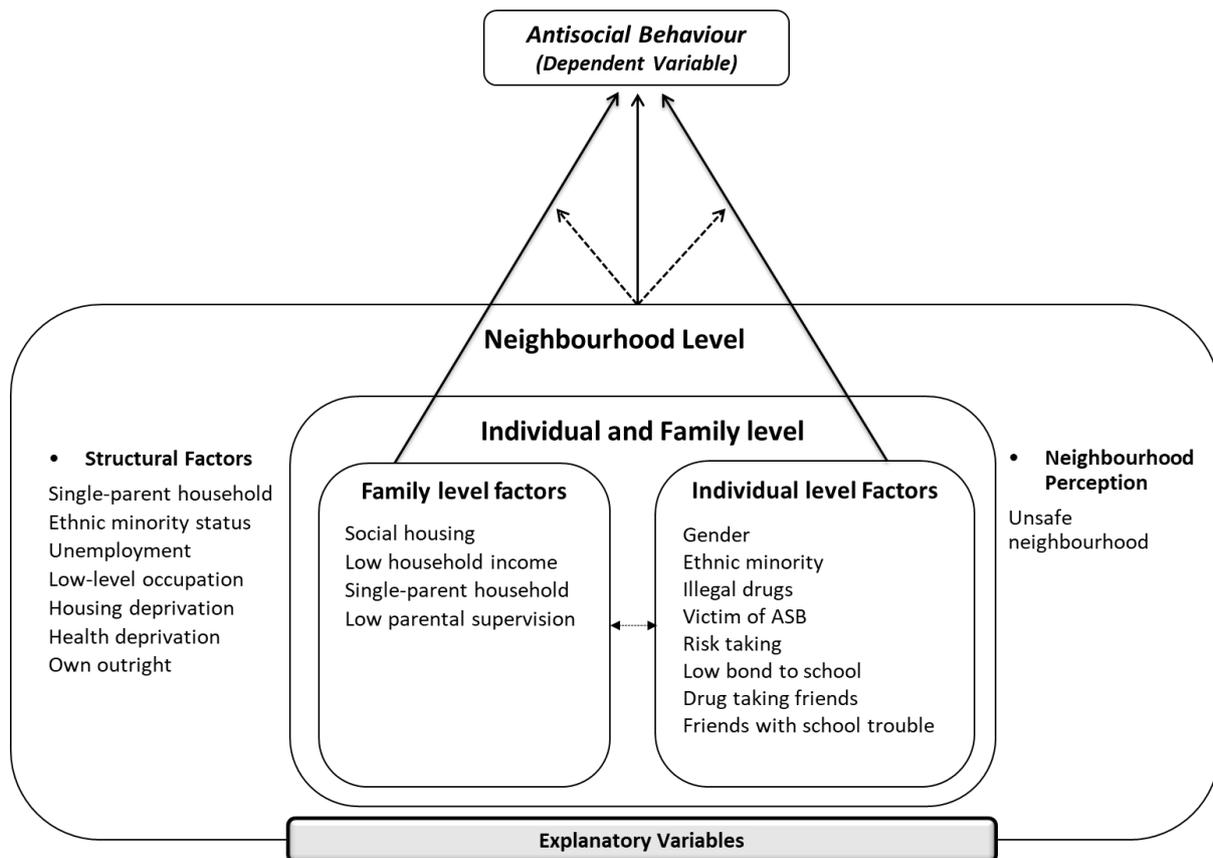


Figure 5.4 shows each level of explanatory variables and their relationship with the dependent variable, antisocial behaviour. It further shows the interactions between individual and family level factors (level-1 factors), and also those between level-1 factors and neighbourhood level factors (i.e., cross-level interactions) (see Chapter 8 for further details). Information on the development of each variable and the data used to create each variable is provided in section 5.3.

Socio-demographic and behavioural factors that are associated with antisocial behaviour are included as individual and family level explanatory variables. The effects of individual and family level factors on antisocial behaviour, and their interactions are tested using multinomial logistic and Poisson regression models in Chapter 7. The neighbourhood effects on antisocial behaviour and the interaction between level-1 and neighbourhood level factors are tested using a number of multilevel models in Chapter 8.

5.5. Analysis Strategy

This section introduces the statistical model adopted to answer the research questions concerning neighbourhood level effects (Research questions 2 and 3) on antisocial behaviour among young people.⁴⁶ It further addresses how this study deals with missing data.

5.5.1. Statistical Model: Multilevel Modelling

In order to analyse variables from different levels simultaneously, this study adopts multilevel modelling, which is a statistical model that appropriately includes the various dependences (Hox, 2010). As noted in Chapter 1, in the social, behavioural and medical sciences, data are often multilevel (clustered, nested or hierarchical) in such a way that lower-level units of analysis belong to high-level units of analysis: individual/family, neighbourhood, and schools (Raudenbush and Bryk, 2002; Snijders and Bosker, 2011; Kreft and Leeuw, 1998). Common mistakes in terms of the underestimation of standard errors and specification errors that occur when analysing hierarchically structured data are avoided in the multilevel modelling context (Hox, 2010).

There was a number of reasons for this study to adopt Multilevel modelling. Firstly, this approach is largely viewed to be suitable when there is more than one unit of analysis that is clustered within another in the model (Raudenbush and Bryk, 2002). In this study, for instance, young people (individuals) and their households are clustered in neighbourhoods. Secondly, a major aim of this study is to measure the effect of cross-level interactions (explained later in

⁴⁶ Individual and family level analysis strategy is described in Chapter 7.

Chapter 8), which is one of the general uses of multilevel modelling. Modelling cross-level interactions involves formulating and examining “how variables measured at one level influence the associations occurring at another” (Raudenbush and Bryk, 2002, p.8). Research question 3-2 is an example of a situation where modelling cross-level effects is needed.

Random intercept models allow this study to discover the extent to which differences between individuals in terms of antisocial behaviour are due to their residence in particular neighbourhoods while all of the other independent variables in the model are held constant. Research question 2-1 – regarding whether the likelihood of antisocial behaviour among young people varies significantly across different neighbourhoods – is addressed by examining the significance of the variance of the random intercept’ in individual and family level (level-1) models using likelihood ratio (LR) tests between Poisson and logistic regression models with and without random variance of antisocial behaviour prevalence rates across neighbourhoods. Research Question 2-2 – regarding which neighbourhood characteristics have significant relationships with neighbourhood level variations in antisocial behaviour among young people – is answered by using two different statistical analyses: LR tests between level-1 models and neighbourhood level models (level-1 + neighbourhood); and the Wald test of significance for the regression coefficients of the neighbourhood factors.

The random intercept model assumes that the relationship between antisocial behaviour and level-1 explanatory variables is the same for each neighbourhood, which means that the slope is fixed across neighbourhoods. However, in behavioural and social research, it is common for the effects of lower-level factors vary randomly across the higher level units (Raudenbush and Bryk, 2002). Since the term ‘slope’ is only appropriate for a linear relationship between two continuous variables, this study uses the more general term ‘coefficient’ and refers to a random slope model as a random coefficient model. Random coefficient modelling allows this study to test whether the effects of level-1 variables on antisocial behaviour vary across different neighbourhoods (Kim, 2004).

Research question 3-1 – regarding whether the effects of level-1 variables on antisocial behaviour among young people vary significantly across neighbourhoods – is answered using the statistical test of the random slope variance. The LR tests between models with and without random effects for each level-1 variable is conducted. Research Question 3-2 – regarding which neighbourhood level characteristics have significant associations with the variation in the level-1 variables’ effects across neighbourhoods – is addressed by examining the significance of the regression coefficients of the cross-level interactions in the multilevel Poisson and multilevel multinomial logistic regression models. Examinations and estimations of these cross-level interaction effects are conducted on a variable-by-variable basis (Hox,

2010). Modelling cross-level interaction effects involves formulating and testing how variables measured at one level (i.e., individual level) influence the relationships occurring at another level (i.e., neighbourhood level) (Raudenbush and Bryk, 2002).

5.5.2. Missing data

There are some missing data in the sixth sweep of the MCS as presented in section 5.2.1. Some approaches in dealing with this issue has been used by researchers. One of the approaches is 'list-wise deletion' which deletes any individuals with missing data on any variable, but it may bias parameters and estimates, especially when data is not missing completely at random (Curley et al., 2019). Missing at Random assumption is adopted by multilevel models in dealing with missing data (Hox, 2010). Missing at Random assumption considers that the missingness depends only on observed variables in the data, however does not depend on the missing data itself (Carpenter and Kenward, 2007; Fagg, 2009). It is suggested by statisticians that Missing at Random is appropriate in most situations and that "multi-level models handle this missing data process by virtue of the maximum likelihood estimation methods" (Fagg, 2009, p.141).⁴⁷

5.6. Ethical consideration⁴⁸

This study uses the sixth sweep of the MCS, which was downloaded from UK data service webpage. These data are anonymised prior to release by the UK Data Service. The researcher agreed to the standard End User Licence provided by the UK Data Service, which safeguards the confidentiality of MCS participants and limits access to these data. However, the standard release MCS dataset contain only 'standard' geographic identifiers (Government Office Region). Since more detailed spatial identifiers that increase the risk of disclosure of confidentiality data were needed, the researcher requested a Secure Access licence from the UK Data Service. Access required accreditation as an ESRC Accredited Researcher, the completion of face-to-face training, and agreement to the Secure Access User Agreement and the Licence Compliance Policy. The Secure Access User Agreement allowed this study secure access to the spatially referenced data remotely from the University of Bristol (the designated

⁴⁷ To check missing patterns of the dependent variable, this study used an extension of Little's (1995) test of missing completely at random which tests the covariate-dependent missingness (CDM) assumption that is used in the presence of covariates (Li, 2013). According to the Little (1995)'s definition, "CMD is a special case of missing at random" (Li, 2013, p.796). The result of CMD test was not statistically significant ($p=1.0$, χ^2 distance =444.1, $df= 975$) which means that antisocial behaviour items can be reasonably considered as CDM given the covariates.

⁴⁸ The information on 'ethics' in this section is mainly derived from the 'Millennium Cohort Study – Ethical review and Consent' (Centre for Longitudinal Studies, 2014) and the 'Millennium Cohort Study Sixth Sweep Technical Report' (Ipsos MORI, 2016).

IP address) through the UK Data Service Secure Remote Access Service. The confidentiality of the study participants was safeguarded at all times and all of the research data was securely stored on the University of Bristol server. More information on the approach taken to ethical review and informed consent for the various stages of the MCS is provided in Appendix 5.4. On top of the ethical consideration made by the UK Data Service, this study was also reviewed and approved by the University of Bristol, School for Policy Studies' Ethics Committee.

5.7. Conclusion

As discussed in the literature review chapters, some previous UK studies have attempted to measure the association between neighbourhood conditions and child outcomes mainly in response to concerns about increasing spatial polarisation (Lupton, 2003). However, these studies were mostly conducted with a small number of limited structural neighbourhood factors, such as socioeconomic status, deprivation and social resources (Piotrowska et al., 2012) or small samples using a qualitative approach (Arai, 2007). Qualitative studies can report young people's own understanding of antisocial behaviour in connection with neighbourhood effects but have limited representativeness and no objectively verifiable result (Choy, 2014). Moreover, previous studies on this issue, in general, have considered structural neighbourhood factors rather than both structural and perception factors. Therefore, this study will contribute to the existing literature by investigating neighbourhood structural and perception factors' effects on antisocial behaviour among young people with a sample that is representative of young people in England and Wales.

Using the statistical methods and measurement models described in this chapter, the three following analysis chapters are presented: 'measuring youth antisocial behaviour' (Chapter 6), 'individual and family level analysis on antisocial behaviour' (Chapter 7) and 'neighbourhood level analysis on antisocial behaviour' (Chapter 8). In Chapter 6, this study develops a measurement model for antisocial behaviour and presents a descriptive analysis of the resultant index. It describes how the sample is distributed and shows how the prevalence of antisocial behaviour varies by individual, family, and neighbourhood characteristics. The second analysis chapter (Chapter 7) provides a 'baseline' individual and family level analysis, which tests the relationship between socio-demographic and behavioural factors and antisocial behaviour. The final research model of this study, which addresses neighbourhood effects on antisocial behaviour after taking into account individual and family level effects, is tested in Chapter 8.

Chapter 6. Measuring youth antisocial behaviour

This chapter develops a validated antisocial behaviour (ASB) measurement using a variety of relevant tests and provides a descriptive analysis of the derived measure. Section 6.1 develops the ASB measure. A well validated ASB index can ensure that the index used is measuring what it is supposed to measure. In order to correctly address the individual, family and neighbourhood level factors' effects on ASB, the construction of a validated ASB measurement is essential. However, in previous research, ASB was often created by simply adding up a list of items that were deemed to be related to ASB without properly testing them for reliability or validity (see Estévez and Emler, 2011; Barnes et al., 2002). Thus, developing a well validated ASB measure will contribute to the existing knowledge by improving the precision and consistency of evidence related to ASB. In order to develop a validated measure, this study conducts reliability and validity tests including a Cronbach's alpha test, an item response theory test, and a relative risk test.

After the development of the validated ASB measure, it is then used to create both count and categorical dependent variables. Treating ASB as either count or categorical data has limitations. For example, categorising count data into fewer categories causes information loss. Furthermore, using count ASB data will not provide sufficient information if we are interested in discriminating between perpetrators and non-perpetrators. Also, when developing categorical ASB data, relevant tests need to be used to identify an optimal threshold that distinguishes between severe, minor and non-ASB perpetrators. This study comes up with a strong ASB measurement and examines dependent variables for both count and categorical data, allowing the final results to be interpreted in a more meaningful way.

Section 6.2 investigates how the prevalence of ASB varies according to the socio-demographic, behavioural and neighbourhood level characteristics of the participants. To understand the distribution of the data and to identify the relationships among the variables, univariate analysis is conducted. This process allows this study to offer descriptive analysis of the data as well as to make comparisons between the characteristics of young people who have engaged in severe or minor forms of ASB with those who have never engaged in any forms of ASB using descriptive statistics methods.⁴⁹ This chapter only describes the

⁴⁹ This study treats the dependent variable, antisocial behaviour, as both count and categorical data. The Count antisocial behaviour data ranges between 0 and 10, while the categorical data categorised young people into three groups: 'never' contains young people who have not done any forms of ASB during the past 12 months, 'minor' contains young people who have committed at least one type of any minor forms of ASB (namely graffiti, vandalism, police questioning, police formal caution and rude/noisy in public and hitting someone) and 'severe' contains young people who have committed at least one type of any severe forms of ASB (including using a weapon, carrying a weapon, being a street gang and shoplifting).

prevalence of ASB among young people by study sample characteristic. Significance testing between the explanatory variables and ASB is presented in the following Chapters, 7 and 8.

6.1. Measuring youth antisocial behaviour

The dependent variable for this study, ASB, is created by aggregating a list of items that are deemed to measure ASB. In order to develop a robust ASB index, the validity and reliability of the index needs to be tested. An index is considered reliable when it produces accurate, reproducible, and consistent results from one occasion to another; that is to say, even when we have different samples, we should get the same results using the same set of indicators (Gliem and Gliem, 2003; Underwood and Teresi, 2002).

Validity is a key requirement that each item has to fulfil to be an eligible candidate for the aggregate indicator as it refers to “how accurately a method/index measures what it is intended to measure” (Middleton, 2019b, p.1). An index is considered valid if it provides a result that reflect real properties and variations in the social or physical world. This study examines construct validity to evaluate whether the ASB measurement used by the study really represents antisocial behaviour. To achieve construct validity, researchers need to ensure that their indicators and measurements are developed based on relevant existing knowledge and, in regard to ASB, the questionnaire needs to include only relevant questions that measure known indicators of, for example, ASB (Middleton, 2019a). Thus, the construct validity of each item could be guaranteed by deciding the extent to which the measurement correlates with some criterion measures whose validity is acceptable (Fahmy et al., 2011). This can be applied by measuring the relative risk ratio for each item in a scale against established correlates of ASB while controlling for other recognised predictors. The subsections 6.1.1 and 6.1.2 provide details of the process adopted to build a reliable and scientifically valid measure of ASB.

6.1.1 Reliability

The reliability of the dependent variable, ASB, is tested using the classical test theory, Cronbach`s alpha coefficient, which is the most commonly applied coefficient of reliability test (Guio et al., 2017) and an item response theory test. Cronbach`s alpha coefficient test gives information on the reliability of the ASB index as a whole and allows the internal consistency of the index to be checked. Item response theory gives further information on the reliability of each individual item in the index.

The unidimensionality of the items that are considered to be associated to the construct of ASB is tested using the Cronbach`s alpha reliability coefficient, which normally ranges between 0 and 1. “The closer Cronbach`s alpha coefficient is to 1.0 the greater the internal

consistency of the items in the scale” (Gliem and Gliem, 2003, p.87). The thirteen items all have high alpha coefficients ($\alpha = .73$)⁵⁰ (see Table 6.1 below). The Cronbach’s alpha value for each item shows the value that consists of all of the items in the index, except for one item. For example, the Cronbach’s alpha value of .71 for ‘Rude/noisy in public’ is the value of the index when the item is deleted from the index. All of the items add to the reliability of the index although the indicators for robbery ($\alpha = .73$), stealing ($\alpha = .73$) and being arrested ($\alpha = .73$) contribute only a little. Robbery ($r = .24$), stealing ($r = .25$) and being arrested ($r = .26$) also show relatively low item-rest correlations, which are the correlations between an item and the scale formed by all of the other items. Although the items still have acceptable internal consistency as a whole ($\alpha = .73$), the Cronbach’s alpha value of some items including robbery, stealing and being arrested are flagged since they contribute little to the reliability of the index.

Table 6.1 Reliability test of antisocial behaviour scale: Cronbach’s alpha reliability coefficient

Item	Item-rest correlation	Cronbach’s α (if item deleted)
Rude/noisy in public	.41	.71
Shoplifting	.38	.71
Graffiti	.41	.71
Vandalism	.47	.70
Carrying a weapon	.38	.71
Hitting someone	.30	.72
Stealing	.25	.73 ✓
Using a weapon	.32	.72
Street gang	.36	.72
Robbery	.24	.73 ✓
Police questioning	.44	.71
Police formal caution	.41	.71
Being arrested	.26	.73 ✓
Cronbach’s α		.73

Note: N= 8,963, N of items=13

Source: Sixth survey of the MCS (University of London et al., 2019) (author’s analysis, weighted data)

Item response theory, also referred to as latent trait analysis, provides information on the relationships between participant’s responses to questionnaire items and an unobserved latent trait for example, mathematical ability, level of depression or behavioural characteristics (Thissen and Steinberg, 2009). Thus, measurement accuracy and reliability can be significantly improved by using item response theory (An and Yung, 2014).⁵¹

A two-parameter item response theory test measures discrimination and difficulty/severity. The discrimination scores show how well each item discriminates between the young people

⁵⁰ George and Mallery (2003) provide the following rules of thumb for the interpretation: > .9 (Excellent), > .8 (Good), > .7 (Acceptable), > .6 (Questionable), > .5 (Poor), and < .5 (Unacceptable).

⁵¹ To find out more about Item response theory see (Thissen and Steinberg, 2009; Guio et al., 2017; An and Yung, 2014).

who have displayed ASB and those who have not (Guio et al., 2012; An and Yung, 2014). This parameter is related to the slope of the item characteristic curve (ICC), which can be identified by checking the steepness of the ICC (Bichi and Talib, 2018) (see figure 6.2).⁵² The discrimination score shows “how fast the probability of success changes with ability near the item difficulty. An indicator with a high discrimination score has a high correlation between the latent trait and the probability of success on that indicator” (Stata Corp, 2017). This means that an indicator with a high discrimination score can discriminate better between different levels of antisocial behaviour. “In general, a discrimination value higher than 1 is desirable for a good test item and a score higher than 0.75 is also acceptable” (Bichi and Talib, 2018, p.148).

The criterion that this study utilises is flagging the items when their discrimination value is lower than 1, as suggested by Chiesi et al. (2017) and Bichi and Talib (2018). As shown in Table 6.2, all thirteen indicators seem to distinguish well between young people who have reported engaging in ASB and those who have not (>.1.0). The best indicator for distinguishing between young people who have been involved in ASB and others is vandalism (*discrimination*=3.5). In contrast, hitting someone (*discrimination*=1.2) is not as good for classifying young people into the above two groups.

Table 6.2 Testing reliability of antisocial behaviour scale: *Two-Parameter Item Response Theory test*

Item	<i>Discrimination</i> ^a	<i>Difficulty</i> ^b
Rude/noisy in public	1.9***	1.5***
Shoplifting	2.1***	2.3***
Graffiti	2.5***	2.4***
Vandalism	3.5***	2.0***
Carrying a weapon	2.1***	2.5***
Hitting someone	1.2***	0.8***
Stealing	2.0***	3.1*** ✓
Using a weapon	2.7***	2.7***
Street gang	2.0***	2.4***
Robbery	3.3***	3.3*** ✓
Police questioning	2.3***	1.3***
Police formal caution	2.4***	1.7***
Being arrested	2.1***	3.0*** ✓

Note: N=9,855 ***p<.001,

2PL=two-parameter model, *df* =degrees of freedom, *SE*= standard error.

Source: Sixth survey of the MCS (University of London et al., 2019) (author’s analysis, weighted data)

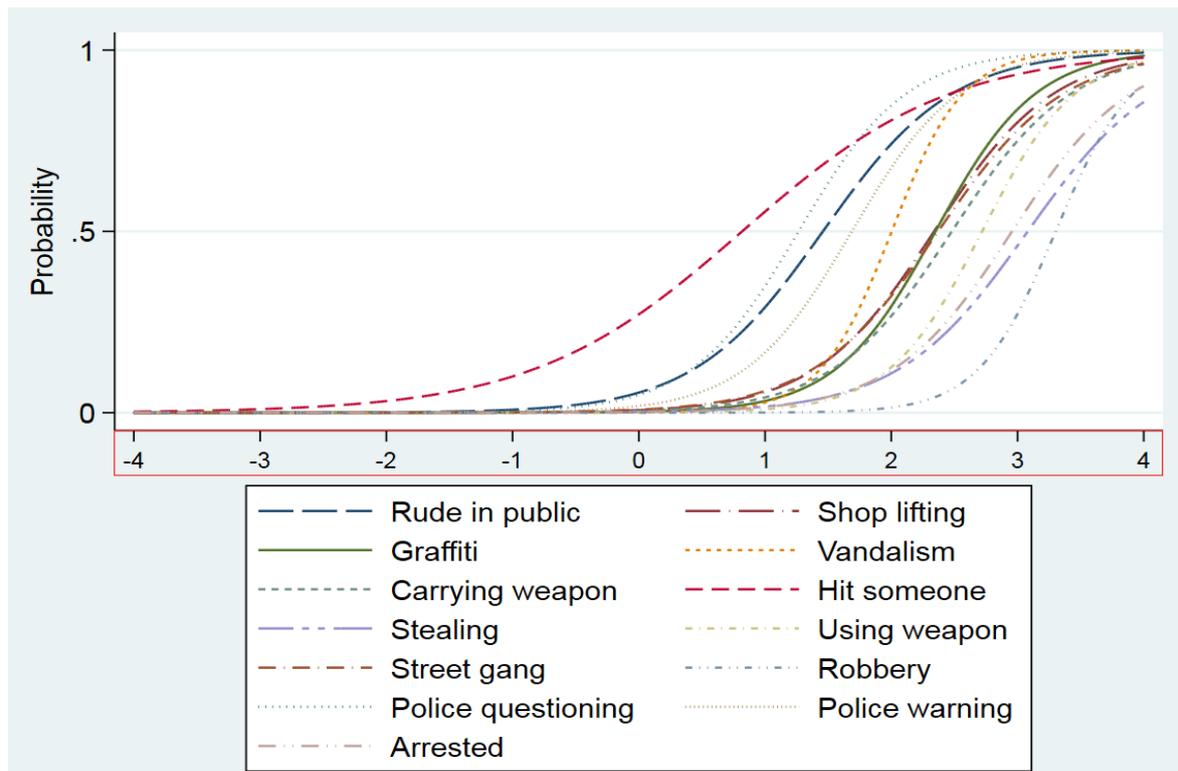
The second parameter provides information about the difficulty of ASB associated with each item. The higher the threshold, the higher the difficulty of ASB associated with the item. The

⁵² “An item characteristic curve plots the probability that an examinee will respond correctly to an item solely as a function of the test’s latent trait” (Bichi and Talib, 2018, p.145).

difficulty scores are calculated in units of standard deviation (*SD*) from the mean. As in Guio et al. (2012), this study sets the difficulty criterion at three *SD* from the average, e.g., the items with a difficulty higher/lower than three *SD* are flagged. According to the results, robbery (*difficulty*= 3.3), stealing (*difficulty*= 3.1), and being arrested (*difficulty*= 3.0) show extreme difficulty, exceeding/reaching three standard deviations from the mean. Among the rest of the items, using a weapon (*difficulty*=2.7), carrying a weapon (*difficulty*=2.5) and being a member of a street gang (*difficulty*=2.4) are associated with more severe forms of ASB.

Discrimination and difficulty parameters are used to construct a curve for each ASB (item information curve). It visualises which parameters discriminate better between perpetrators of ASB and others (slope of the curve) and characterises the degree of difficulty of ASB associated with a given ASB difficulty (Figure 6.1). Items located at the right hand end of the continuum of ASB (x-axis), namely robbery, stealing and being arrested, show extreme ASB difficulty, exceeding/reaching 3. Other items located on the right hand side of the continuum of ASB (x-axis), but that are not too extreme, such as using a weapon and carrying a weapon, are related to higher ASB difficulty. Young people involved in these behaviours are therefore much more likely to perpetrate ASB.

Figure 6.1 Two-Parameter item response theory test on ASB scale: *Item characteristics curves*



Source: Sixth survey of the MCS (University of London et al., 2019) (author's analysis; weighted data)

6.1.2 Validity

Validity of an ASB scale is tested to secure that all items in the scale are valid measures of ASB. Each ASB item are considered to be valid “if it exhibits statistically significant relative risk ratios with a set of independent variables known to be correlated with the latent construct of ASB” (Guio et al., 2017, p.28). This study tests this association by conducting binary logistic regressions for each ASB item against each explanatory variable that are considered to be associated with ASB (e.g., construct validity).

From the literature review, the association between ASB among young people and the following factors is investigated: use of illegal drugs, impulsiveness, risk taking behaviour, victimisation experience of ASB, low household income, ethnic minority status, owning house outright, single-parent households, low bond with school and drug taking friends and friends with school trouble. To confirm whether the thirteen indicators of ASB from the Millennium Cohort Study (MCS) validly measure ASB, this study tests the association between the thirteen indicators and predictors of ASBs by using relative risk tests.⁵³ The original types of the predictor variables of ASB were originally binary, categorical or count. However, since relative risk ratios can only be estimated when both dependent and explanatory variables are binary, all the predictors are recoded as binary variables. The original variables in the MCS and their recoding process are summarised in Appendix Table A 2 (in Appendix Chapter 5).

Table 6.3 shows the results of the relative risk tests between the indicators and the predictors of ASB. Based on a series of the test results, the risk of committing each indicator of ASB, in general, is higher among young people who have the characteristics or behaviours that are identified as related with ASB in previous studies. Most indicators of ASB in the MCS, except robbery and stealing show a statistically significant positive association with the majority of the predictors of ASB, including: use of illegal drugs, low bond with school, drug taking friends, friends with school trouble, and victimisation of ASB. For example, the relative risk of committing shoplifting among young people who have taken illegal drugs is 12 times higher ($RR=12.3$, $p<.001$) compared to that of the young people who have not taken illegal drugs, and the relative risk of being arrested among young people who have drug taking friends is 7 times higher ($RR=7.3$, $p<.001$) compared to those who do not have drug taking friends.

⁵³ Relative risk ratios and their 95% confidence intervals offer useful estimates in deciding the significance, the size and direction of the differences between two groups (Gordon, 2012). Relative risk informs the risk or probability of one group (for example, employers) considering an item is important in comparison to the other group (for example, employees). For example, a relative risk of 3.0 refers to three times the risk, that of 0.5 refers to half the risk and a relative risk of 1 means that there are no differences between the two groups. "When the 95% confidence intervals of a relative risk ratio across 1.0, the differences between the groups are unlikely to be 'significant'. On the other hand, if the 95% confidence Intervals of a relative risk ratio do not across 1.0 then the difference is likely to be statistically significant" (Gordon, 2012, p.2).

Table 6.3 The association between the indicators of and the predictors of antisocial behaviour: *Relative Risk Test*

Predictors of ASB	Indicators of antisocial behaviour						
	Rude in public	Shoplifting	Graffiti	Vandalism	Carrying a weapon	Hit someone	Stealing
Illegal drugs	4.0(3.4-4.7) ***	12.3(9.5-15.9) ***	10.8(7.9-14.6) ***	14.4(10.8-19.3) ***	9.4(6.7-13.1) ***	2.1(1.9-2.3) ***	5.6(3.3-9.5) ***
Risk taking	1.4(1.2-1.6) ***	1.5(1.1-2.1) *	1.8(1.2-2.5) **	1.5(1.1-2.2) *	1.3(0.9-1.9)	1.3(1.2-1.5) ***	1.5(0.7-3.0)
Victim of ASB	2.8(2.4-3.4) ***	4.8(3.5-6.4) ***	4.3(3.0-6.1) ***	5.4(3.9-7.5) ***	8.2(5.9-11.4) ***	2.5(2.3-2.7) ***	13.5(8.3-22.0) ***
Low bond with school	3.0(2.6-3.4) ***	3.9(3.0-5.1) ***	4.9(3.6-6.5) ***	7.3(5.5-9.8) ***	4.0(2.9-5.6) ***	1.7(1.6-1.9) ***	3.4(2.1-5.6) ***
Drug taking friends	4.5(3.6-5.6) ***	6.9(4.6-10.4) ***	6.2(3.8-9.9) ***	9.9(6.6-14.7) ***	8.1(5.1-12.7) ***	2.0(1.7-2.4) ***	8.4(4.1-17.0) ***
Friends with school trouble	2.8(2.4-3.3) ***	3.3(2.4-4.6) ***	4.5(3.1-6.3) ***	5.1(3.7-7.1) ***	2.5(1.7-3.6) ***	1.7(1.5-1.9) ***	3.6(2.0-6.5) ***
Gender	1.2(1.0-1.3) *	1.4(1.1-1.9) *	1.3(0.9-1.7)	1.7(1.2-2.4) **	1.9(1.3-2.8) **	1.9(1.8-2.1) ***	1.6(0.9-2.7)
Low household income	1.2(1.1-1.4) **	1.2(0.9-1.6)	1.6(1.2-2.2) **	1.5(1.1-2.1) **	1.6(1.1-2.2) **	1.1(1.1-1.2) **	1.4(0.8-2.3)
Ethnic minority status	0.9(0.8-1.1)	1.0(0.7-1.4)	0.9(0.6-1.3)	0.8(0.5-1.1)	0.9(0.6-1.3)	1.2(1.1-1.3) **	1.7(1.0-2.9) *
Social housing	1.3(1.1-1.5) **	1.7(1.3-2.2) ***	1.5(1.1-2.1) *	1.8(1.3-2.6) ***	1.9(1.3-2.7) ***	1.1(1.0-1.2) *	1.0(0.6-1.7)
Single-parent household	1.4(1.2-1.6) ***	1.6(1.2-2.2) **	2.0(1.5-2.7) ***	2.0(1.4-2.7) ***	1.9(1.3-2.7) ***	1.2(1.1-1.3) **	1.4(0.8-2.3)
N of non-significant items	1	2	2	1	2	0	5 ✓
	Using a weapon	Street gang	Robbery	Police questioning	Police warning	Being arrested	
Illegal drugs	8.1(4.6-14.1) ***	9.0(6.6-12.3) ***	13.6(4.3-43.0) ***	4.7(4.1-5.3) ***	6.0(5.0-7.2) ***	8.1(4.6-14.5) ***	
Risk taking	2.0(1.1-3.4) *	1.7(1.2-2.5) **	2.4(0.7-7.6)	1.7(1.4-1.9) ***	2.0(1.6-2.4) ***	2.0(1.1-3.7) *	
Victim of ASB	13.8(8.2-23.3) ***	4.1(2.9-6.0) ***	5.7(1.8-18.9) **	2.8(2.4-3.3) ***	3.2(2.6-4.1) ***	2.9(1.3-6.4) **	
Low bond with school	5.3(3.1-8.9) ***	5.4(4.0-7.3) ***	2.0(0.7-6.0)	2.8(2.4-3.2) ***	3.3(2.7-4.0) ***	3.5(2.1-6.0) ***	
Drug taking friends	15.0(7.0-32.3) ***	6.8(4.4-10.4) ***	16.5(4.4-61.1) ***	1.7(1.4-1.9) ***	3.7(2.6-5.1) ***	7.3(3.5-15.4) ***	
Friends with school trouble	3.7(2.0-6.7) ***	5.4(3.9-7.5) ***	5.4(1.7-17.0) **	3.2(2.5-4.1) ***	3.1(2.5-3.8) ***	3.8(2.0-7.2) ***	
Gender	3.7(1.6-8.4) **	0.8(0.6-1.1)	2.4(0.7-7.7)	6.0(5.0-7.2) ***	1.6(1.3-1.9) ***	1.5(0.8-2.6)	
Low household income	1.7(1.0-3.0) *	2.3(1.6-3.1) ***	2.4(0.8-7.4)	1.9(1.6-2.1) ***	2.6(2.2-3.1) ***	3.5(2.0-6.1) ***	
Ethnic minority status	1.3(0.7-2.3)	1.0(0.7-1.4)	1.1(0.2-5.0)	0.8(0.7-1.0) *	0.9(0.7-1.1)	1.1(0.6-2.1)	
Social housing	1.0(0.6-1.9)	2.6(1.9-3.6) ***	2.2(0.7-6.9)	1.9(1.6-2.2) ***	2.3(1.9-2.8) ***	2.7(1.6-4.7) ***	
Single-parent household	1.2(0.7-2.2)	1.6(1.2-2.3) **	1.5(0.4-5.3)	1.6(1.4-1.9) ***	1.9(1.6-2.3) ***	2.4(1.4-4.2) **	
N of non-significant items	3	2	7 ✓	0	1	2	

Note: *p<.05, **p<.01, ***p<.001, Numbers in parentheses: 95% Confidence Interval

Source: Sixth survey of the MCS (University of London et al., 2019) (author's analysis, weighted data)

However, some ASB indicators are not significantly associated with certain predictors of ASB. For example, ethnic minority status is not significantly associated with committing shoplifting ($RR=1.0, p >.05$). In some cases, although the relative risk ratios are over 1, the confidence intervals span around 1.0, which means that the result is not significant ($p >.05$). In particular, two indicators, robbery and stealing are not significantly associated with five or more predictors of ASB.⁵⁴ As suggested from the item response theory test results, these two items could be extreme behaviours that are not clearly associated with ASB.

Table 6.4 shows the items deleted from the ASB indices on the basis of the reliability and validity tests results. The results of the two different reliability tests indicate that some indicators, namely robbery, stealing and being arrested, lack reliability. The Cronbach's alpha test results suggest that the inclusion of the three indicators adds little to the precision of ASB indices. According to the item response theory test results, robbery, stealing and being arrested show extreme difficulty, exceeding/reaching three standard deviations from the mean. The construct validity test results indicate that some indicators, including, stealing, using a weapon and robbery, are 'extreme' behaviours, and that involvement in these behaviours is not clearly associated with ASB, which means they lack construct validity. Three items, namely stealing, robbery and being arrested violate two or more types of the reliability or validity test results, suggesting that the items are not 'good' measures of ASB and they have therefore been deleted from the ASB scale.

Table 6.4 Reliability and validity test results of antisocial behaviour scale and deleted items

	Deleted items ^a (N of violation)	Reliability		Validity	
		Cronbach's α	Item response theory		Relative risk
			Discrimination	Difficulty	
Rude/noisy in public					
Shoplifting					
Graffiti					
Vandalism					
Carrying a weapon					
Hitting someone					
Stealing	✓ (3)	✓		✓	
Using a weapon					
Street gang					
Robbery	✓ (3)	✓		✓	
Police questioning					
Police formal caution					
Being arrested	✓ (2)	✓		✓	

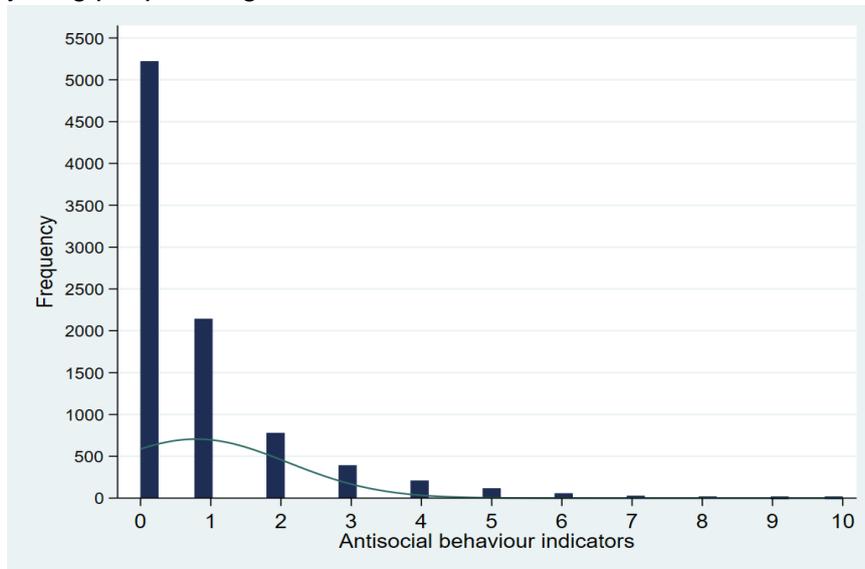
Note: a-items are deleted if they violate two or more types of test result criterion

Therefore, the final ASB index is built from the following ten items: rude/noisy in public, shoplifting, graffiti, vandalism, carrying a weapon, hitting someone, using a weapon, street

⁵⁴ As suggested in Guio et al. (2017), indicators are flagged if they are not associated with more than five predictors (approximately 50% of the total number of predictors) of ASB.

gang, police questioning and police formal caution. Figure 6.2 below shows the final version of cumulative distribution of the prevalence of antisocial behaviour among young people.

Figure 6.2 Cumulative distribution of prevalence of final antisocial behaviour in total amongst young people at age 14



6.1.3 Type of dependent variable

Consideration is now given to deciding the appropriate type of ASB in investigating the relationship between the independent variables and ASB among young people. Treating the ASB data, which varies between 0 and 10, as a count variable prevents information loss, which could reduce statistical power. Also, since the ASB data do not have to be collapsed into fewer categories this allows this study to use Poisson regression modelling. Poisson regression modelling is useful in finding out what happens to the dependent variable for a one-unit increase in each independent variable. However, Poisson regression analysis would not be appropriate if we were interested in discriminating between perpetrators and non-perpetrators.

Categorising the ASB data into fewer categories, on the other hand, allows this study to make a distinction between severe or minor ASB perpetrators and non-perpetrators, and makes it easier to interpret the results (Sawkins, 2002). Making a distinction between young people who engage in more and less severe forms of ASB with non-perpetrators also allows this study to identify more meaningful and practical policy suggestions, for example, by targeting interventions to reduce severe or minor forms of antisocial behaviour. However, categorising count data into fewer categories could cause this study to lose some information on ASB. Using a categorical data as a dependent variable requires this study to conduct a multinomial or multinomial logistic regression.

Treating the ASB as either a count or categorical data has limitations. Therefore, on top of using ASB as a count variable, the original form of the ASB data, this study also transforms the count ASB data into a more interpretable categorical variable and conducts both Poisson regression analysis and multinomial logistic regression analysis.⁵⁵ To convert the ASB data into a categorical data that can distinguish between severe ASB, minor ASB and non-perpetrators, the author of this study reviewed previous studies that have identified a threshold value in measuring the effects of ASB. An item response theory test was also conducted to identify more and less severe forms of ASB items used in this study.

To establish appropriate thresholds that distinguish between severe ASB, minor ASB and non-perpetrators, this study reviewed previous studies including official reports that have used self-reported categorised or binary ASB data as a dependent variable. Some previous studies have made a distinction between young people who have engaged in any type of ASB and those who have not. For example, a Home Office research study of the Youth Lifestyles Surveys distinguishes between young people who have committed any offending and the rest (Armstrong et al., 2005). However, this type of approach is insufficient in capturing severe forms of ASB, since it groups any type of ASB into the same group regardless of the difficulty, and therefore there is no distinction between severe and less severe forms of ASB.

On the other hand, some studies have tried to capture the characteristics of severe or persistent ASB. Armstrong et al. (2005) set a threshold of 2+ to distinguish between young people who have committed more than one type of offending from young people who have been involved in less than two types of offences. This type of approach, however, could capture whether young people have committed more types of offending rather than capturing severe forms of ASB. Therefore, this approach may lead us to misinterpret evidence and conclude that young people who have been involved with a few minor forms of ASB (e.g., being noisy in public) are serious offenders, while treating young people who have committed one type of severe form of offending (e.g., committing violent behaviour or being involved in stealing or robbery) in the same way as non-offenders.

⁵⁵ When the counts are of relatively rare events, like the pattern of antisocial behaviour distribution in this study, it is generally considered that they follow a Poisson distribution, and they could be modelled utilising a generalised linear model (Hox, 2010). In addition, when there is an excess of zero counts in the data, zero-inflated Poisson (ZIP) regression is recommended (Lambert, 1992; UCLA, 2022). Since the distribution of antisocial behaviour indicators shows excess of zero counts (see Figure 6.2), this study considered adopting ZIP regression and tested whether a conventional Poisson or ZIP regression is more suitable. Since the likelihood ratio test could not be adopted as the models are not clustered, the AIC and BIC are checked (Stata Corp, 2020). "The AIC and BIC are typically used to compare a range of competing models, and the model(s) with the lowest AIC or BIC value is considered the most attractive" (Hox, 2010, p.51). The test result shows that the Poisson and ZIP model have similar AIC and BIC values (see Appendix Table A 7 in Appendix Chapter 6). ZIP model has lower AIC value compared to Poisson model, while Poisson model has lower BIC, which leads this study to conclude that ZIP model is not particularly preferable. Thus, this study adopts the standard Poisson regression model.

In addition, Flood-Page et al. (2000) classified behaviour as serious ASB either when young people had been involved in more than two types of offences, or when they had committed any severe forms of offences (for example, violence, burglary or robbery). In the Edinburgh Study of Youth Transitions and Crime (McAra and McVie, 2010), violence such as assault, weapon carrying and robbery were considered to be serious offending. By considering the differences between different types of ASB, this kind of approach enables us to make a distinction between young people who commit severe ASB and the rest. However, the above studies lost information by combining young people who had engaged in less severe ASB with non-perpetrators. Therefore, in constructing the dependent variable, this study makes a distinction between non-perpetrators, perpetrators of minor forms of ASB, and perpetrators of severe forms of ASB (rather than combining minor ASB perpetrators with non-perpetrators).

To identify which items in the index are severe forms of ASB and which are comparatively minor forms, item response theory (IRT) tests (Table 6.5) are conducted.

Table 6.5 Testing difficulty of antisocial behaviour indicators: *Two-Parameter item response theory test*

Indicators	Difficulty	Discrimination
Using a weapon	2.81 ***	2.51 ***
Carrying a weapon	2.49 ***	2.09 ***
Street gang	2.39 ***	1.97 ***
Shoplifting	2.38 ***	2.03 ***
Graffiti	2.36 ***	2.50 ***
Vandalism	1.99 ***	3.61 ***
Police questioning	1.26 ***	2.34 ***
Police formal caution	1.70 ***	2.28 ***
Rude/noisy in public	1.45 ***	1.97 ***
Hitting someone	0.82 ***	1.20 ***

Note: N=9,849; ***p<.001

Source: Sixth survey of the MCS (University of London et al., 2019) (author's analysis, weighted data)

The IRT test allows this study to capture the more severe end of the ASB spectrum by checking the difficulty. Table 6.5 above shows the two-parameter item response theory test results of the ten items in the ASB index. According to the results, using a weapon (difficulty=2.81), carrying a weapon (difficulty=2.49), being in a street gang (difficulty=2.39) and shoplifting (difficulty=2.38) show higher difficulty compared to the rest of the items and, therefore, are associated with more severe forms of ASB. Although graffiti also shows relatively high difficulty (2.36) since it is on the border line, only the four items with the highest difficulty scores are considered to be 'severe' forms of ASB in order to ensure that the severe category includes the items that have been suggested by youth delinquency/antisocial behaviour studies to be severe forms of antisocial behaviour (Hoge, 2009; Pakiz et al., 1997;

Skilling et al., 2001; McDermott, 1983) and to secure consistency with the previous literature on ASB (Flood-Page et al., 2000; McAra and McVie, 2010). A number of studies on youth offending/antisocial behaviour have defined severe forms of antisocial behaviour. Most of the studies viewed that serious antisocial behaviour includes violent and property crime such as homicide, rape, aggravated assault, burglary, and robbery while certain behaviours, for example heavy drinking, are not considered severe antisocial behaviour (Hoge, 2009; Pakiz et al., 1997; Skilling et al., 2001; McDermott, 1983).

On the basis of the IRT results, this study grouped ASB into three categories as follows:

- Never: young people who **have not engaged in any forms of antisocial behaviour** during the past 12 months,
- Minor: young people who have engaged in **any minor form of antisocial behaviour**, namely 'graffiti', 'vandalism', 'police questioning', 'police formal caution', 'rude/noisy in public' and 'hitting someone'
- Severe: young people who have engaged in **any severe form of antisocial behaviour**, namely 'using a weapon', 'carrying a weapon', 'being in a street gang' and 'shoplifting'.

In summing up, this study treats the dependent variable, ASB as both count and categorical data and conducts two separate analyses, namely a Poisson regression analysis and a multinomial logistic regression analysis.⁵⁶

6.2. Descriptive analysis

This section provides information on the sample distribution and prevalence of ASB by individual and family and neighbourhood level information. This helps us to understand the distribution of the data, enables outliers and typos to be detected, and allows for the identification of the relationships among the variables. A total of 11,726 young people participated in the sixth sweep of the MCS. Among the participants, 9,457 young people who live in England and Wales were left as the sample for this study.⁵⁷ The sample descriptions of the individual and familial level and neighbourhood level variables are provided in sections 6.2.1 and 6.2.2 respectively.

⁵⁶ Since the outcome variable, antisocial behaviour is an unobserved variable, this study considered modelling it as latent factor by using models such as structural equation modelling (Mueller and Hancock, 2018) or factor analysis (Bandalos and Finney, 2018). However, since it needs to analyse variables from different levels (individual and neighbourhood) simultaneously, this study adopts multilevel modelling. The relationships between participant's responses to questionnaire items and an unobserved latent trait (antisocial behaviour) is tested using item response theory (see Section 6.1).

⁵⁷ For more information on the construction of each level of covariates and dependent variable, please refer to Methodology chapter (Chapter 5).

6.2.1 Sample description of individual and family level factors

Sample description of socio-demographic factors

Descriptive statistics for the study sample of socio-demographic factors are presented in Table 6.6. The population is distributed evenly between males and females, where 48% of the participants are female. The majority of the study sample is White (78%), while the composition of the other ethnic groups is around 20% of the total sample: Mixed (6%), Pakistani and Bangladesh (6%), Black and Black British (5%), Indian (3%), and Other (3%). This percentage is similar to that reported in the study of Armstrong et al. (2005), where 71% of the young respondents reported that they were White; however, this is less than in other similar studies.⁵⁸ A similar ethnicity distribution is observed in the 2011 Census data where the majority ethnicity for those aged between 10 to 14 is White (82%), while the composition of the other ethnic groups is less than 20% of the total sample: Asian (9%), Black (5%), Mixed (4%) and Other (1%). The majority of the respondents live in owner-occupied housing (56%), while less than 20% of the respondents live in rented or other types of housing and 28% live in social housing. One in four respondents is from a single-parent household, while the majority (75%) of the respondents are from two-parent households.

On top of the sample distribution, Table 6.6 also shows the prevalence of ASB by sociodemographic characteristic. From the bottom of the table, it is noticeable that almost half of the respondents (44%) have engaged in at least minor ASB, while only one in ten of the respondents (9%) reported committing severe ASB. A similar pattern is found in previous research that studied the characteristics of severe ASB. Almost one in ten (8%) of the young people in the 1998/1999 Youth Lifestyles Survey reported that they had perpetrated serious ASB (Flood-Page et al., 2000). The 'severe' column gives further information on the characteristics of the young people who have engaged in severe forms of ASB. For example, among the 8% of the young people who have committed severe ASB, the majority are male (58%). Armstrong et al. (2005) also found a similar pattern, as more male participants reported perpetrating severe ASB compared to females. Males have a slightly higher mean level of ASB, 1.1, compared to that of female respondents (0.7) at a statistically significant level ($p < .001$).

The majority of the young people who are male (53%), from Mixed ethnic status (55%), or from Black or Black British ethnic status (53%), and who live in social housing (52%), are from

⁵⁸ In the study of *Youth Survey 2001* and *Youth at Risk*, 89% of the participants were White, whereas in the study of *Youth Transitions and Crime*, 94% of the participants were White.

households in the second income quintile (55%) and/or are from a single parent household (52%) and have engaged in at least minor ASB.

Table 6.6 Sample description of socio-demographic factors by reporting of antisocial behaviour

Socio demographic factors	Reporting of Antisocial behaviour					Total ^c
	Never	Categorical (%)		Severe (Col) ^a	Count	
		Minor	Severe		Mean ASB ^b	
Gender (%)						
<i>All</i>	56	35	9	100	0.9***	9,849 (<i>N</i>)
<i>Female</i>	65	27	8	43	0.7	48
<i>Male</i>	47	43	10	58	1.1	52
Ethnicity (%)						
<i>All</i>	56	35	9	100	0.9***	9,760 (<i>N</i>)
<i>White</i>	56	35	9	81	0.9	78
<i>Mixed</i>	45	44	11	8	1.0	6
<i>Indian</i>	57	39	4	1	0.7	3
<i>Pakistani and Bangladesh</i>	66	29	6	4	0.6	6
<i>Black or Black British</i>	48	46	7	4	0.9	5
<i>Other</i>	59	29	12	4	0.9	3
Housing tenure (%)						
<i>All</i>	56	35	9	100	0.9***	9,658 (<i>N</i>)
<i>Owner occupation</i>	61	33	6	39	0.7	56
<i>Private rent & other</i>	50	40	10	19	1.0	16
<i>Social housing</i>	48	38	14	43	1.2	28
Household income (%)						
<i>All</i>	56	35	9	100	0.9***	9,849 (<i>N</i>)
<i>Highest quintile</i>	64	32	5	11	0.6	20
<i>Fourth quintile</i>	62	31	8	17	0.7	20
<i>Third quintile</i>	54	37	10	22	0.9	20
<i>Second quintile</i>	48	41	11	24	1.1	20
<i>Lowest quintile</i>	51	37	12	26	1.0	19
Single-parent household (%)						
<i>All</i>	56	35	9	100	0.9***	9,849 (<i>N</i>)
Other family type	59	34	8	58	0.7	75
Single-parent household	48	39	13	42	1.1	25
N	5,222	3,047	710	710	0.9	9,849 (<i>N</i>)
%	56	35	9	9	(Mean)	100

Note: a-% of participants who reported severe ASB by each of the explanatory factor, b-Analysis of variance (ANOVA) is conducted to check if the means of the groups are significantly different from each other, c-% unless stated otherwise, ***p<.001, 'Never': have not done any forms of ASB, 'Minor'/Severe': have done at least one type of any minor/severe forms of ASB (see Chapter 5)

Source: Sixth survey of the MCS (University of London et al., 2019) (author`s analysis, weighted data)

In regard to ethnicity, among the young people who have committed severe ASB, the majority (81%) are from the White ethnic group, while among all of the White participants, only one in ten (9%) said that they had engaged in any type of severe ASB. This result is similar to the findings from the 1988/1999 Youth Lifestyles Surveys, which found that among White and Mixed ethnic groups, 20% had committed severe ASB - although it did not use the exact same threshold as this study. Minor ASB is much more common, with around 30% to 40% of each

ethnic group reporting perpetrating minor ASB. The mean levels of ASB for ethnicity range between 0.6 (Pakistani and Bangladesh) and 1.0 (Mixed).

Regardless of their housing type, around half of the respondents have engaged in at least minor forms of ASB. However, among the young people who have committed severe ASB, almost half of them (43%) reported that they live in social housing, while less than 10% who live in owner-occupied housing reported engaging in severe ASB. The mean levels of ASB are much lower for young people who live in their own housing (0.7) compared to respondents who live in social housing (1.2). Almost half (49%) of the respondents from the households in the lowest income quintile reported that they have engaged in at least minor ASB, and among the young people who have committed severe ASB, half of them (50%) are from the lowest two quintiles, while 10% are from the highest quintile.⁵⁹ The mean levels of ASB for the five household income quintile groups are between 0.6 (highest quintile) and 1.0 (lowest quintile).

A slightly higher proportions of young people from single-parent households have engaged in at least minor ASB (52%) compared to young people from other family types (41%). The mean levels of ASB are much higher among young people who are from single-parent households (1.1) compared to those from other household types (0.7) at a statistically significant level ($p < .001$). Flood-Page et al. (2000) also showed that young people who have engaged in severe ASB are more likely to be from single-parent households than from households with both birth parents. Only one in ten respondents from the non-single parent households in Flood-Page et al.'s (2000) study reported perpetrating severe ASB.

Sample description of behavioural factors

Descriptive statistics for the study sample of behavioural factors are presented in Table 6.7. Few participants have tried illegal drugs: only 6% of young people said that they had tried illegal drugs at least once, but a much higher proportion of the young people (23%) reported that they had at least some drug taking friends. It might be the case that as this information was derived from self-reported data, the respondents were unwilling to report undetected criminal behaviour of their own (Thornberry and Krohn, 2000), while they were more relaxed about reporting that of their friends. Regarding problematic behaviours, one in five young people showed high levels of risk taking (20%). The half of the respondents said that they have been a victim of at least one type of ASB (50%), and around one in ten respondents (7%) said that they have been a victim of more than two types of ASB.

⁵⁹ For household income variable, this study used OECD equivalised income quintiles by country variable. Please refer to Methods Chapter (Chapter 5) for more information on household income variable.

Table 6.7 Sample description of behavioural factors by reporting of antisocial behaviour

Behavioural factors	Reporting of Antisocial behaviour by type					Mean ASB ^b	Total ^c
	Never	Minor	Severe	Severe (Col) ^a	Count		
Individual Level factors							
Illegal drugs (%)							
<i>All</i>	56	35	9	100	0.9***	9,841 (N)	
<i>Never</i>	58	35	7	68	0.7	95	
<i>Once or twice</i>	15	44	41	14	2.8	3	
<i>More than two times</i>	6	30	64	18	3.9	3	
A victim of antisocial behaviour (%)							
<i>All</i>	56	35	9	100	0.9***	9,830 (N)	
<i>Never</i>	71	24	5	26	0.5	50	
<i>One type</i>	54	39	8	24	0.8	27	
<i>Two types</i>	27	59	14	24	1.5	15	
<i>More than two types</i>	16	51	34	26	2.4	7	
Risk taking							
<i>All</i>	56	36	9	100	0.9***	8,429 (N)	
<i>The rests</i>	58	34	8	73	0.8	80	
<i>High risk taking</i>	47	41	12	27	1.2	20	
Low bond with school							
<i>All</i>	56	35	9	100	0.9***	9,844 (N)	
<i>High bond</i>	61	33	6	55	0.7	83	
<i>Low bond</i>	30	46	24	45	1.8	17	
Drug taking friends (%)							
<i>All</i>	56	35	9	100	0.9***	8,355 (N)	
<i>None of them</i>	66	30	5	38	0.6	77	
<i>Some of them</i>	28	50	22	52	1.8	21	
<i>Most or all of them</i>	14	43	43	10	3.2	2	
Friends with school trouble (%)							
<i>All</i>	55	36	9	100	0.9***	8,427 (N)	
<i>None of them</i>	74	23	3	10	0.4	29	
<i>Some of them</i>	51	40	9	63	0.9	61	
<i>Most or all of them</i>	29	46	25	27	2.0	10	
Low parental supervision							
<i>All</i>	56	35	9	100	0.9***	9,832 (N)	
<i>Others</i>	60	33	7	67	0.7	89	
<i>Low parental supervision</i>	21	51	28	34	2.2	11	
N	5,222	3,047	710	710	0.9	9,849 (N)	
%	56	35	9	9	(Mean)	100	

Note: a-% of participants who reported severe ASB by each of the explanatory factor, b-Analysis of variance (ANOVA) is conducted to check if the means of the groups are significantly different from each other, c-% unless stated otherwise, ***p<.001, 'Never': have not done any forms of ASB, 'Minor'/'Severe': have done at least one type of any minor/severe forms of ASB (see Chapter 5)

Source: Sixth survey of the MCS (University of London et al., 2019) (author's analysis, weighted data)

Regarding school related factor, approximately one in six (17%) young people reported having a low bond with school, while many more respondents reported that they had friends with school troubles: some of them (61%) and most or all of them (10%). Regarding parental factors, one in ten (11%) young people were reported (by parents) to be receiving low parental supervision.⁶⁰

On top of the sample distribution, Table 6.7 also shows the prevalence of ASB by behavioural characteristics that are suggested by previous studies to be associated with ASB. Some

⁶⁰ The respondents were considered to experience low parental supervision when they had high scores on a scale made out of three questions on whether the parents know about the young people's life outside of the house (Please refer to Chapter 5 for more information).

behavioural factors show a more obvious relationship with severe ASB, while others show a closer relationship with minor ASB. Behavioural factors, namely illegal drug use shows noticeable relationships with severe ASB. For example, the majority (64%) of the young people who have used illegal drugs more than twice have also engaged in severe ASB, while less than 30% of them have perpetrated minor ASB.

Behavioural factors, namely being a victim of ASB, having a low bond with school, friends with school trouble, and low parental supervision show a close relationship with minor ASB. For example, a majority of the young people who have been a victim of two types (59%) and more than two types (51%) of ASB reported committing at least one type of minor ASB. A similar pattern is evident in the 2003, 2004 and 2005 Youth Lifestyles Surveys. For example, in the 2005 data, a majority (65%) of those who had perpetrated an offence had been a victim as well (Phillips and Chamberlain, 2006).

Also, almost eight in ten (79%) respondents who have experienced low parental supervision have also engaged in at least minor ASB. In addition, one in three (28%) respondents reported perpetrating at least one type of severe ASB, while less than 10% of those who have not experienced low parental supervision reported perpetrating severe ASB. Flood-Page et al.'s (2000) study also examined the effects of parental supervision and found that less than one in ten respondents reported perpetrating severe ASB when they did not experience poor supervision. Although the parenting style measures are not exactly the same between this study and Flood-Page et al.'s (2000), it is noticeable from the comparison that experiences of low parental supervision are much more common amongst young people who commit severe ASB compared to those who do not. Meanwhile, having drug-taking friends seems to be related to both minor and severe ASB. Among the respondents who reported that most or all their friends take drugs, two fifths (43%) have engaged in minor ASB or severe ASB.

Certain behavioural factors, such as illegal drugs and drug taking friends are associated with high mean levels of ASB. For example, the young people who said that they had tried illegal drugs have three to four times higher mean levels of ASB: the mean levels of ASB are 2.8 and 3.9 for those who have tried illegal drugs once or twice and more than two times respectively compared to the total mean levels of ASB (0.9). Similar figures are found from the mean levels of ASB for drug taking friends. Meanwhile, for young people without friends that make trouble at school the mean levels of ASB are only 0.4, which is much lower than the average ASB (0.9) and 5 times lower than that of the young people who stated that most of their friends make trouble at school (2.0). This pattern, which shows that ASB perpetrators are more likely to have friends with certain problem behaviours including drug taking or making trouble in school, has also been found from other studies of ASB. Both Armstrong et al. (2005) and

McAra and McVie (2010) showed increase rates of offences when respondents had delinquent peers, or peers who committed a wide range of offending behaviours.

The statistical significance of these associations is tested using single and multivariate logistic and Poisson regression analyses in section 7.1.

6.2.2 Sample description of area level factors

Descriptive statistics for the study sample of area level factors are presented in Table 6.8. For the descriptive analysis, bivariate neighbourhood level explanatory variables are created to make a distinction between areas with high concentrations of deprivation and other areas with lower concentrations of deprivation. The original form of the neighbourhood level variables is continuous and ranges between 0 and 100. However, dichotomous neighbourhood level variables are created to show the association between ASB and each neighbourhood level characteristic more clearly. Table 6.8 shows the prevalence of ASB by the neighbourhood level characteristics that are suggested in the literature to be associated with ASB.

In general, ASB is more prevalent in areas with high concentrations (top 10% of the distribution) of risk factors compared to areas with lower concentrations (the majority 90%). Both minor ASB and severe ASB are more prevalent among young people who live in areas with high concentrations (top 10%) of single parent households, low occupational status and/or health deprivation compared to those who live in areas with lower concentrations (the majority 90%). For example, the majority (53%) of the young people who live in areas with high concentrations (top 10%) of single parent households reported that they have either engaged in minor (41%) or severe (12%) forms of ASB while a slightly lower proportion (44%) of the young people who live in areas with lower concentrations (the majority 90%) reported that they have engaged in either minor (35%) or severe (9%) forms of ASB. Also, a majority (51%) of the young people who live in areas with high concentrations (top 10%) of population with a low level occupation reported that they have either engaged in minor (40%) or severe (11%) forms of ASB, while a lower proportion (44%) of the young people who live in areas with lower concentrations reported that they have engaged in either minor (35%) or severe (9%) forms of ASB. A similar pattern is shown in the relationship between ASB and health deprivation.

In addition, some area level factors such as ethnic minority status, housing deprivation (shared accommodation) and living in an unsafe neighbourhood show more noticeable associations only with minor ASB. For example, nearly two in five (38%) of the young people who live in areas with high concentrations (top 10%) of ethnic minority population reported that they have committed minor forms of ASB, which is slightly higher than the rate for the young people who live in areas with lower concentrations (35%).

Table 6.8 Sample description of neighbourhood factors by reporting of antisocial behaviour

Neighbourhood factors	Reporting of Antisocial behaviour						
	Never	Categorical (%)			Count	Total ^c	
		Minor	Severe	Severe (Col) ^a	Mean ASB ^b		
Ethnic Minority Status (%)							
<i>All</i>	56	35	9	100	0.9	9,529 (N)	
<i>Top 10%</i>	54	38	9	9	0.8	9	
<i>Rest</i>	56	35	9	91	0.9	91	
Single Parent (%)							
<i>All</i>	56	35	9	100	0.9**	9,842 (N)	
<i>Top 10%</i>	48	41	12	14	1.1	11	
<i>Rest</i>	57	35	9	86	0.8	89	
Low level Occupation (%)							
<i>All</i>	56	35	9	100	0.9***	9,842 (N)	
<i>Top 10%</i>	49	40	11	13	1.1	10	
<i>Rest</i>	57	35	9	87	0.8	90	
Unemployed (%)							
<i>All</i>	56	35	9	100	0.9	9,842 (N)	
<i>Top 10%</i>	59	31	9	7	0.8	7	
<i>Rest</i>	55	36	9	93	0.9	93	
Own outright (%)							
<i>All</i>	56	35	9	100	0.9	9,529 (N)	
<i>Top 10%</i>	60	33	7	10	0.8	10	
<i>Rest</i>	55	36	9	90	0.9	90	
Housing deprivation (%)							
Shared accommodation							
<i>All</i>	56	35	9	100	0.9	9,529 (N)	
<i>Top 10%</i>	55	37	8	9	0.8	10	
<i>Rest</i>	56	35	9	91	0.9	90	
No-central heating							
<i>All</i>	56	35	9	100	1.0	9,529 (N)	
<i>Top 10%</i>	53	34	14	14	0.9	10	
<i>Rest</i>	56	35	9	86	1.0	90	
Health deprivation (%)							
Bad health							
<i>All</i>	55	35	9	100	0.9**	9,529 (N)	
<i>Top 10%</i>	49	37	15	13	1.1	8	
<i>Rest</i>	56	35	9	87	0.8	92	
Unsafe Neighbourhood (%)							
<i>All</i>	56	35	9	100	0.9	9,529 (N)	
<i>Top 10%</i>	55	37	8	3	1.0	4	
<i>Rest</i>	56	35	9	97	0.9	96	
	<i>N</i>	5483	3470	889	889	0.9	9,842 (N)
	<i>%</i>	56	35	9	9	(Mean)	100

Note: a-% of participants who reported severe ASB by each of the explanatory factor, b-T test is used to compare the means between two groups, c-% unless stated otherwise, **p<.01 ***p<.001, 'Never': have not done any forms of ASB, 'Minor'/ 'Severe': have done at least one type of any minor/severe forms of ASB (see Chapter 5)
 Source: Sixth survey of the MCS (University of London et al., 2019), Sixth survey of the MCS geographical identifiers (University of London et al., 2017) and 2011 Census aggregated data (Office for National Statistics, 2017) (author's analysis: weighted) (author's analysis: weighted)

The mean levels of ASB for young people who live in areas with high concentrations of single parent households, low level occupations and bad health are higher at a statistically significant level (<.01) compared to the areas with lower concentrations. For example, the mean level of ASB for the young people who live in areas with high concentrations (top 10%) of single-parent households is 1.1, while the mean level of ASB for the areas with lower concentrations is 0.8. This means that, for example, young people who live in areas with a high rate of single-parent households reported that they have engaged in more types of antisocial behaviour on

average, compared to young people who live in areas with less single-parent households. Similar figures are found from the young people who are from the areas with high concentrations of low-level occupations and health deprivation.

6.2.3 Conclusion

This chapter aimed to develop a validated ASB measurement and present a descriptive analysis using the validated measurement developed. In section 6.1, this study conducted a number of reliability and validity tests, namely Cronbach's alpha test, an item response theory test, and a relative risk test to ensure that the antisocial behaviour index was a valid and reliable measure. As a result, three items, namely stealing, robbery and being arrested, were deleted from the original ASB scale since they violated more than two types of the reliability or validity test result, suggesting that the items were not 'good' measures of ASB. Thus, the final ASB index was created with 10 items (see section 6.1). This process allowed this study to build a validated ASB measurement, which is essential in measuring ASB among young people appropriately (Bendixen and Olweus, 1999; Home Office, 2004; Esposito et al., 2020).

Instead of treating ASB only as count data (the original form of the ASB data), this study built both count and categorical ASB data as using either a count or categorical variable has limitations (see section 6.1). Therefore, this study transformed the count ASB data into a more interpretable categorical variable, which enables the study to conduct both multinomial logistic and Poisson regression analyses.

Section 6.2 aimed to measure whether the prevalence of ASB varies according to the socio-demographic and behavioural characteristics of the participants and the characteristics of the areas in which they live. The characteristics of the study sample were described and they were contrasted with the categorical and count ASB data. When the socio-demographic and behavioural factors were contrasted with the categorical and count ASB variables, it was shown that young people who have the characteristics that are deemed by previous studies to be related to ASB tend to commit severe ASB and minor ASB and the mean levels of ASB were in general higher among this group. This result corresponds to the findings from previous studies on ASB, which show, for example, the relationship between ASB and socio-demographic and behavioural factors (Flood-Page et al., 2000; Armstrong et al., 2005; McAra and McVie, 2010).

Meanwhile, when the neighbourhood level predictors were contrasted with the categorical and count ASB variables, ASB was more prevalent in some areas with high concentrations of deprivation (top 10%) compared to areas with lower concentrations. Some neighbourhood characteristics showed a noticeable relationship with minor ASB (i.e., ethnic minority status,

low-level occupation, shared accommodation and unsafe neighbourhood), while others showed a relationship with severe ASB (i.e., single-parent household, no-central heating and health deprivation). This shows the importance of distinguishing between different types of ASB considering the severity of the behaviours. For example, when informing policy makers, this study may suggest that certain characteristics of neighbourhoods influence severe forms of ASB, but they are not associated with minor ASB. However, to come up with these suggestions, this study needs to conduct inferential statistics using different statistical methods such as regression analysis.

Prior to conducting model testing in Chapters 7 and 8, this chapter conducted descriptive analyses. It described how the sample is distributed and it also showed the prevalence of antisocial behaviour by the individual, family and neighbourhood level factors that are suggested from the previous studies to be related to antisocial behaviour. This process is an important first step for conducting further statistical analyses, which allows us to obtain an idea of the distribution of the data and to identify associations among the variables. However, the descriptive analysis results in this chapter do not allow this study to predict the value of ASB based on the value of the other independent variables and they do not provide information on whether or not the relationships found are statistically significant.

Thus, in the following analysis chapters, this study uses a number of multivariate multinomial logistic and Poisson regression analyses, which will enable the study to predict the value of a dependent variable based on the value of other explanatory variables and to compare the strength of the association between each explanatory variable and dependent variable. Using multivariate regression analyses will also provide information on whether or not the model as a whole is statistically significant.

Based on the understanding gained from the descriptive analysis results in this chapter, individual and family level effects on antisocial behaviour will be tested using multinomial logistic and Poisson regression analyses in Chapter 7. Neighbourhood effects on antisocial behaviour and the interactions between the different levels of factors will then be tested using multilevel multinomial logistic and Poisson regression models in Chapter 8.

Chapter 7. Individual and family level analysis

In order to obtain an extended understanding of antisocial behaviour (ASB) among young people, this study incorporates not only individual and family level characteristics but also broader neighbourhood level predictors in the analysis model (see section 5.4). Prior to developing a full model that measures the complicated relationship between individual, family and neighbourhood level factors and the interactions between them, this chapter focuses on individual and family level effects on ASB among young people. As reviewed in Chapter 3, certain individual and family level socio-demographic and behavioural factors (e.g., gender, illegal drug use, peer influence, parenting style and family poverty) have been suggested to have a significant effect on ASB among young people (Pike et al., 1996; Waller et al., 2013) (D'Amico et al., 2008; Hoeve et al., 2012; Jacobson et al., 2002). These factors are incorporated in the individual and family level models of ASB (model 1-4) as predictors.

In section 7.1, bivariate analyses are performed using both categorical and count data as dependent variables.⁶¹ In the bivariate analyses, single logistic and single Poisson regression analyses between the dependent variable and each variable measuring the socio-demographic and behavioural characteristics of respondents are conducted in Table 7.1. Although this does not answer the research questions directly, it is useful in checking the relationship between each explanatory variable and ASB.

To see the association between each socio-demographic and behavioural explanatory variable and the dependent variable while other independent variables are controlled for, multivariate multinomial logistic regression and multivariate Poisson regression analyses are conducted in section 7.2. These multivariate regression analyses are used to test the hypotheses of this study that ***individual and family level factors have significant effects on antisocial behaviour among young people even after controlling for other covariates*** and that ***there are some interactions between individual and family level factors in predicting antisocial behaviour***. More specifically, section 7.2 addresses individual and family level characteristics that are significantly associated with antisocial behaviour among young people (Research Question 1-1). In addition, it also addresses interactions that exist

⁶¹ To compensate for the limitations occurring from treating the dependent variable as either count data or categorical data, this study treated the antisocial behaviour variable as both count and categorical data and conducted two separate analyses, namely a Poisson regression analysis and an multinomial logistic regression analysis. For more information on the type of dependent variable, please refer to Chapter 5.

between individual and family level factors in predicting antisocial behaviour (Research Question 1-2).⁶²

The findings from this chapter will show whether the results of this study correspond to the findings from the previous research on the relationships between ASB among young people and socio-demographic and behavioural factors.

7.1. Bivariate multinomial logistic and Poisson regression analyses

In this section, bivariate analyses between both categorical and count dependent variables and individual and family level independent variables are performed. Bivariate analyses are conducted to explore the association between ASB and each explanatory variable. The aim is to explore whether there exists an association and the strength of this association, or whether there are differences between the two dependent variables and the significance of these differences. A series of bivariate multinomial logistic and Poisson regression analyses between the ASB variable and the independent variables are conducted and presented in Table 7.1.

Column *B* in Table 7.1 presents the estimated multinomial logit coefficients for the model. Since these coefficients are in log-odds units, they are often difficult to interpret, so the coefficients in the multinomial logistic regressions are converted into relative risk ratios, which are presented in column RRR. The relative risk ratios can be interpreted as follows; for example for males in the multinomial logistic regression result in Table 7.1, for a unit increase in gender, i.e., going from 0 (female) to 1 (male), the risk of committing minor ASB increase by 130% and severe ASB (compared with none group) increase by 180 % (RRR=1.8).

In terms of the Poisson regression, this study measures the effect of the independent variable on the ASB variable through *IRR*. The *IRR* represents “the change in the dependent variable in terms of a percentage increase or decrease, with the precise percentage determined by the amount the *IRR* is either above or below 1” (Piza, 2012, p.3). In Table 7.1, the *IRR* for males, 1.6, suggests that the ASB counts increased by approximately 60% with a unit increase in gender, i.e., going from 0 (female) to 1 (male). Conversely, an *IRR* reporting a 60% decrease would be written as 0.4 (a value 0.6 less than 1).

⁶² The research questions on neighbourhood level effects on antisocial behaviour (Research Questions 2 and 3) are addressed in Chapter 8.

Table 7.1 Bivariate multinomial logistic and Poisson regression analyses between antisocial behaviour and individual & family level predictors amongst young people at age 14 in England and Wales

	<i>Multinomial Logistic Regression (DV: Categorical ASB)</i>										<i>Poisson Regression (DV: Count ASB)</i>											
	<i>Never versus Minor</i>					<i>Never versus Severe</i>																
	<i>B</i>	<i>95%CI</i>		<i>SE(B)</i>	<i>Z</i>	<i>RRR</i>	<i>B</i>	<i>95%CI</i>		<i>SE(B)</i>	<i>Z</i>	<i>RRR</i>	<i>B</i>	<i>95%CI</i>		<i>SE(B)</i>	<i>Z</i>	<i>IRR</i>	<i>N</i>			
Socio demographic factors																						
Male	0.8	0.7-	0.9	***	0.1	16.3	2.31	0.6	0.4-	0.8	***	0.1	6.6	1.80	0.5	0.4-	0.6	***	0.0	12.8	1.65	8979
Ethnic minority	0.4	0.2-	0.5	***	0.1	4.8	1.47	0.3	0.0-	0.6	*	0.1	2.2	1.36	0.2	0.1-	0.3	***	0.1	4.2	1.25	8907
Low family income	0.1	0.1-	0.1	***	0.0	5.3	1.10	0.2	0.2-	0.3	***	0.0	7.6	1.26	0.1	0.1-	0.2	***	0.0	11.7	1.16	8979
Housing Tenure	0.4	0.3-	0.5	***	0.1	7.4	1.48	0.9	0.7-	1.1	***	0.1	9.8	2.43	0.5	0.4-	0.5	***	0.0	12.3	1.60	8805
Single-parent household	0.3	0.2-	0.4	***	0.1	5.4	1.36	0.7	0.5-	0.9	***	0.1	7.5	2.02	0.4	0.3-	0.5	***	0.0	10.1	1.51	8979
Behavioural & other factors																						
Illegal drugs	1.5	1.1-	1.9	***	0.2	7.6	4.44	2.3	1.9-	2.7	***	0.2	11.3	10.11	0.5	0.5-	0.6	***	0.0	38.5	1.72	8974
Victim of ASB	0.8	0.8-	0.9	***	0.0	26.5	2.28	1.1	1.1-	1.2	***	0.0	24.0	3.14	0.5	0.5-	0.5	***	0.0	34.9	1.63	8959
High risk taking	1.3	1.0-	1.7	***	0.2	7.5	3.77	1.8	1.2-	2.4	***	0.3	5.8	6.22	1.2	1.0-	1.5	***	0.1	9.5	3.41	8429
Low bond with school	0.2	0.2-	0.2	***	0.0	23.1	1.23	0.4	0.3-	0.4	***	0.0	25.8	1.44	0.2	0.2-	0.2	***	0.0	38.8	1.19	8976
Drug taking friends	1.3	1.1-	1.4	***	0.1	18.0	3.52	2.3	2.1-	2.5	***	0.1	23.7	10.02	0.9	0.9-	1.0	***	0.0	30.1	2.58	7720
Friends with school trouble	0.8	0.7-	0.9	***	0.0	16.9	2.27	1.5	1.4-	1.7	***	0.1	19.3	4.68	0.8	0.7-	0.8	***	0.0	27.8	2.14	7751
Low parental supervision	0.4	0.4	0.4	***	0.0	23.9	1.48	0.6	0.6-	0.7	***	0.0	26.0	1.90	0.3	0.3-	0.3	***	0.0	40.0	1.33	8966

Note: ***p<.001, *p<.05, B=Coefficient, RRR= relative risk ratio, IRR: incidence rate ratios, CI= 95% confidence interval, SE= Robust Standard Error, DV: dependent variable for each model, N: number of observations

Source: MCS Wave 6 (author's analysis, weighted)

It is noticeable that all of the individual and family level independent variables are significantly associated with the ASB variable both in the multinomial logistic regressions and the Poisson regressions in Table 7.1. Among the socio-demographic factors, strong relationship is found between gender and ASB and social housing and ASB. In the multinomial logistic regression result, the risk of committing minor ASB are 230% (RRR=2.3) and severe are 180% (RRR=1.8 higher among boys compared to girls and the risks of committing minor ASB are 50% (RRR=1.5) and severe are 240% (RRR=2.4) higher among young people who live in social housing compared to those who do not. In the Poisson regression result, both being male and living in social housing increase ASB counts by 60% (IRR=1.6).

A stronger relationship is found between ASB and behavioural factors compared to socio-demographic factors in both tests, including illegal drug taking (Minor RRR=4.4, Severe RRR=10.1, IRR=1.7), drug taking friends (Minor RRR=3.5, Severe RRR=10.0, IRR=2.6) and high risk taking (Minor RRR=3.8, Severe RRR=6.2, IRR=3.4). For example, a unit increase in drug taking friends raises the risks of committing severe ASB 10 times (Severe RRR=10.0) and it also increases ASB counts by around 3 times (IRR=2.6). Similarly, a unit increase in high risk taking raises the risks of committing severe ASB 6 times (Severe RRR=6.2) and it also increases ASB counts by almost 3.5 times (IRR=3.4).

Bivariate analysis is useful in looking at the relationship between each explanatory variable and ASB. However, it cannot predict the value of the ASB variable based on the value of two or more explanatory variables. Since this study aims to measure the relationship between ASB and a number of socio-demographic and behavioural variables, adopting a multivariate data analysis is more appropriate. Thus, the next sub-section analyses the relationship between ASB and selected socio-demographic and behavioural explanatory variables by using multivariate multinomial logistic and multivariate Poisson regression analyses.

7.2. Research Question 1: Multivariate regression models

Question 1-1: What are the individual and family level risk factors that are associated with antisocial behaviour among young people?

Question 1-2: What interactions are there between individual and family level factors in predicting antisocial behaviour?

In this section, multivariate multinomial logistic regression and Poisson regression analyses are carried out to answer Research Questions 1-1 and 1-2. Two different statistics are used to address these questions: first, the LR tests are used to examine whether the inclusion of a group of variables (i.e., socio-demographic, behavioural or interaction variables) significantly improves the overall model fit. Then the significance of each regression coefficients of the individual and family level variables in model 3 and the interaction variables in model 4 are examined to see the relationships between each explanatory variable and ASB.

Multivariate Poisson regression and multivariate multinomial logistic regression are extensions of simple Poisson regression and simple multinomial logistic regression respectively. They are adopted to predict the value of a dependent variable based on the value of other explanatory variables. Multivariate analyses also allow us to compare the strength of the relationship between each explanatory variable and ASB. In addition, they also provide information on whether or not the model as a whole is a statistically significant model by testing the null

hypothesis that all of the coefficients on the explanatory variables are equal to zero. In other words, they test whether the model as a whole fits significantly better than an empty model (e.g., a model with no predictors) (UCLA, 2018).

Four steps are taken to conduct the multivariate multinomial logistic and Poisson regression analyses, which are presented in models 1 through to 4 in Table 7.2 and Table 7.3. The first two models show the test results when only socio-demographic (model 1) and only behavioural (model 2) risk factors are included as explanatory variables. In model 3, both socio-demographic and behavioural variables are included after testing the multi-collinearity for each independent variable. In model 4, interactions are included after undertaking a backward stepwise deletion process of all possible first-order interaction effects between the individual and family level independent variables based on the p-values.

7.2.1. Multivariate multinomial logistic regression analyses

Table 7.2 shows the multivariate multinomial logistic regression test results. The likelihood ratio (LR) test results (in the first line at the bottom) show that the inclusion of the explanatory variables in each model statistically significantly improves the model fit compared to the empty model without any predictors. The LR tests between models 2 & 3, models 1 & 3, and models 3 & 4 are carried out in order to test whether the inclusion of each group of socio-demographic variables, behavioural variables and interaction variables results in a statistically significant improvement in the fit of the model. For the case of the LR test between models 2 & 3, this study can reject the null hypothesis based on the p-value, indicating that the coefficients for the socio-demographic factors are not simultaneously equal to zero. This means that the inclusion of the socio-demographic variables (model 1) in model 3 creates a statistically significant improvement in the fit of the model (UCLA, 2019).

The LR test between models 1 & 3 also indicates that the inclusion of the behavioural variables (model 2) in model 3 creates a statistically significant improvement in the fit of the model. The LR test between models 3 & 4 indicates that the inclusion of the interaction variables in model 4 creates a statistically significant improvement in the fit of the model. In model 1, when only socio-demographic risk factors are included, all of the socio-demographic risk factors except ethnic minority and low household income significantly predict ASB. In model 2, when only behavioural factors are included, all of the risk factors significantly predict ASB. Model 3 includes all of the socio-demographic and behavioural independent variables after testing for multicollinearity. None of the 12 independent variables show multicollinearity issues when tested for a variance inflation factor (VIF) after the regression analysis (see Appendix Table A 8 in Appendix Chapter 7 for VIF test result).

In model 3, all of the socio-demographic predictors except low household income and single-parent household and all of the behavioural predictors except risk taking predicted ASB at a significant level. The strength of each relationship is summarised by the relative risk ratios (RRR).⁶³ Among the nine significant relationships, being male, taking illegal drugs, being a victim of ASB and having drug taking friends and increased the risk of committing both severe and minor ASB by around 200-300%, when the other variables in the model were held constant. For a unit increase in the other variables including being from an ethnic minority, living in social housing, having a low bond with school, having friends with school trouble and having low parental supervision also increased the risk of committing severe ASB by between 10% to 50%.

Table 7.2 Multivariate multinomial logistic regression analyses between antisocial behaviour and individual and family level predictors amongst young people at age 14 in England and Wales

	Model 1&2					Model 3					Model 4				
	<i>B</i>	<i>95% CI</i>	<i>SE</i>	<i>Z</i>	<i>RRR</i>	<i>B</i>	<i>95% CI</i>	<i>SE</i>	<i>Z</i>	<i>RRR</i>	<i>B</i>	<i>95% CI</i>	<i>SE</i>	<i>Z</i>	<i>RRR</i>
Never versus Minor															
<i>Socio demographic factors</i>															
	<i>Model 1</i>														
Male	0.5***	0.4 - 0.6	0.0	13.1	1.66	0.8 ***	0.7 - 1.0	0.1	11.0	2.27	0.8 ***	0.7- 1.0	0.1	11.0	2.27
Ethnic minority	0.1	0.0 - 0.2	0.1	1.7	1.09	0.4 **	0.2 - 0.6	0.1	3.5	1.47	0.4 ***	0.2- 0.6	0.1	3.5	1.48
Low household income	0.1**	0.0 - 0.1	0.0	2.9	1.05	0.0	0.0 - 0.1	0.0	1.0	1.03	0.0	0.0- 0.1	0.0	1.1	1.03
Social housing	0.3***	0.2 - 0.4	0.0	5.8	1.34	0.2 *	0.0 - 0.4	0.1	2.1	1.23	0.2 *	0.0- 0.4	0.1	2.1	1.22
Single-parent household	0.2***	0.1 - 0.3	0.0	4.8	1.25	-0.1	-0.3 - 0.1	0.1	-1.1	0.90	-0.1	-0.3- 0.1	0.1	-1.1	0.90
	<i>Model 2</i>														
<i>Behavioural & other factors</i>															
Illegal drugs	0.7**	0.3- 1.1	0.2	3.2	1.92	0.6 **	0.2 - 1.0	0.2	3.0	1.87	2.0 ***	1.0- 3.0	0.5	3.9	7.59
Victim of ASB	0.7***	0.7- 0.8	0.0	17.6	2.10	0.7 ***	0.6 - 0.8	0.0	16.7	2.07	0.7 ***	0.6- 0.8	0.0	16.7	2.06
High risk taking	1.0***	0.5- 1.4	0.2	4.1	2.62	0.2	-0.3 - 0.7	0.3	0.9	1.25	0.2	-0.3- 0.7	0.3	0.9	1.25
Low bond with school	0.1***	0.1- 0.1	0.0	7.1	1.09	0.1 ***	0.1 - 0.1	0.0	8.2	1.11	0.1 ***	0.1- 0.1	0.0	8.3	1.12
Drug taking friends	0.5***	0.3- 0.7	0.1	5.8	1.69	0.6 ***	0.4 - 0.8	0.1	6.6	1.82	0.6 ***	0.4- 0.8	0.1	6.6	1.81
Friends with school trouble	0.3***	0.2- 0.5	0.1	5.6	1.41	0.3 ***	0.1 - 0.4	0.1	3.9	1.29	0.2 ***	0.1- 0.4	0.1	3.8	1.28
Low parental supervision	0.3***	0.2- 0.3	0.0	11.5	1.30	0.2 ***	0.2 - 0.3	0.0	9.9	1.26	0.2	0.2- 0.3	0.0	9.9	1.26
<i>Interactions</i>															
Low bond with school*Drug use											0.1 ***	-0.2 - 0.1	0.0	-3.5	0.88

⁶³ For more information on the interpretation of the relative risk ratio, please refer to section 7.1.

Table 7.2 (continued)

	Model 1&2					Model 3					Model 4				
	B	95% CI	SE	Z	RRR	B	95% CI	SE	Z	RRR	B	95%CI	SE	Z	RRR
Never versus Severe															
Socio demographic factors															
	<i>Model 1</i>														
Male	0.6 ***	0.4- 0.8	0.1	6.6	1.83	0.7 ***	0.4- 1.0	0.1	4.9	1.97	0.7 ***	0.4- 1.0	0.1	4.9	1.97
Ethnic minority	0.1	-0.2- 0.4	0.1	0.5	1.07	0.4 *	0.1- 0.8	0.2	2.3	1.56	0.4 *	0.1- 0.8	0.2	2.3	1.55
Low household income	0.0	-0.1- 0.1	0.0	0.7	1.03	0.0	-0.1- 0.1	0.1	0.1	1.01	0.0	-0.1- 0.1	0.1	0.1	1.01
Social housing	0.7 ***	0.5- 1.0	0.1	5.8	2.03	0.4 *	0.1- 0.8	0.2	2.4	1.54	0.4 *	0.1- 0.8	0.2	2.4	1.54
Single-parent household	0.4 **	0.2- 0.6	0.1	3.4	1.46	-0.1	-0.4- 0.2	0.2	-0.7	0.90	-0.1	-0.4- 0.2	0.2	-0.7	0.89
	<i>Model 2</i>														
Behavioural & other factors															
Illegal drugs	1.2 ***	0.8- 1.6	0.2	5.5	3.25	1.1 ***	0.7- 1.6	0.2	5.4	3.14	3.1 ***	2.0- 4.1	0.5	5.8	21.65
Victim of ASB	0.9 ***	0.8- 1.1	0.1	14.4	2.55	0.9 ***	0.8- 1.0	0.1	13.9	2.50	0.9 ***	0.8- 1.0	0.1	13.8	2.49
High risk taking	0.9 *	0.0- 1.8	0.4	2.0	2.43	0.3	-0.6- 1.2	0.5	0.6	1.35	0.3	-0.6- 1.2	0.5	0.7	1.37
Low bond with school	0.1 ***	0.1- 0.2	0.0	7.1	1.16	0.2 ***	0.1- 0.2	0.0	7.4	1.18	0.2 ***	0.1- 0.2	0.0	8.2	1.20
Drug taking friends	0.9 ***	0.7- 1.2	0.1	7.2	2.54	1.0 ***	0.7- 1.2	0.1	7.5	2.69	1.0 ***	0.7- 1.2	0.1	7.4	2.64
Friends with school trouble	0.8 ***	0.5- 1.0	0.1	7.0	2.14	0.6 ***	0.4- 0.9	0.1	5.7	1.91	0.6 ***	0.4- 0.9	0.1	5.8	1.91
Low parental supervision	0.4 ***	0.3- 0.4	0.0	10.3	1.42	0.3 ***	0.3- 0.4	0.0	9.4	1.40	0.3 ***	0.3- 0.4	0.0	9.3	1.39
Interactions											-0.2 ***	-0.3- -0.1	0.0	-4.7	0.83
Low bond with school*Drug use															
^a Likelihood ratio (LR) test (df)	M1 -45882 (5)***					M2 -26714 (7) ***					-25555 (12)***				
LR test between M1&3											40655 (7)*** ^b				
LR test between M2&3, 3&4											2319 (5)*** ^c				
N of observations	M1 8735					M2 6360					6220				
												123 (1)*** ^d			
												6220			

Note: Incorporated independent variables in each model: Model1 (Socio demographic) Model2 (Behavioural) Model3 (Model1+2 after multicollinearity test) Model4 (Model3 + interactions), *p<.05 **p<.01 ***p<.001, B=coefficient, IRR= incidence rate ratios, CI= 95% confidence interval, SE= Robust Standard Error, a-null model as a reference, b-model1 as a reference, c-model2 as a reference, d-model3 as a reference

Source: MCS Wave 6 (author`s analysis, weighted)

In model 4, the interaction variables are included to see whether the effect of an independent variable changes depending on the value of one or more of the other independent variables. Some previous studies on ASB have suggested that interactions exist between some independent variables in explaining ASB. These are the interactions between: gender and parenting style (Bank et al., 2004); poverty and parental supervision (Sampson, 1994; Eamon, 2002; Brody et al., 1994; Conger et al., 1994; Reid et al., 2002); parental supervision and ethnic type (McLeod et al., 1994); parenting style and peer effects (Henry et al., 2001); and single-parent household and poverty (Eamon, 2002). Interactions that are suggested from previous empirical studies on ASB and all possible pairs of independent variables are included in the model to test the interaction effects using a backward stepwise selection process. The backward stepwise selection begins with the full model with all of the predictors in model 3 and all suggested first-order interactions. Interactions are deleted iteratively with the least useful interactions (with the largest p-value) being removed, one at a time (Lindsey and Sheather, 2010). After this process, one pair of interaction between low bond with school and illegal drug use.

The significant interaction effects could be interpreted as follows. A unit increase in low bond with school reduces the effect of illegal drug use (Severe RRR=.21.65) on ASB. This means that although the likelihood of perpetrating ASB is greater among some young people, i.e. those who use illegal drugs, the gap between young people who use and who do not use illegal drugs reduces when the young people experience a low bond with school (Minor RRR=.88, severe RRR=. 83). When the interactions are included in the model, as well as the interaction terms, a revised interpretation between the dependent variable and each independent variable is also required. When the interactions are not included, the relative risk ratio of low bond with school in model 3 means that the risk of committing severe ASB is 20% (Severe RRR=1.2) greater among young people who have a low bond with school compared to those who have a higher bond with school. But when the interactions are included, the relative risk ratio of having a low bond with school in model 4 could be interpreted slightly differently. The risk of committing severe ASB is 20% (Severe RRR=1.2) greater among young people with a low school bond who have not used illegal drugs. With the inclusion of the interaction terms in model 4, the relative risk ratio for illegal drugs increased dramatically from 3.1 to 21.7 (severe ASB) and 2.0 to 7.6 (minor ASB) but the relative risk ratio of most of the variables did not change dramatically.

The inclusion of the interactions in model 4 helps in understanding how the effect of some independent variables on ASB changes, depending on the value(s) of one or more other

independent variable(s). As previous studies have suggested, significant interaction effects are found between, for example, gender and parenting style (Bank et al., 2004); poverty and parental supervision (Sampson, 1994; Eamon, 2002; Brody et al., 1994; Conger et al., 1994; Reid et al., 2002); and parenting style and peer effects (Henry et al., 2001) when each interaction variable is included in the model without including other interaction variables. However, after conducting backward stepwise multinomial logistic regression, which starts to fit a full model including all possible first-order interactions, the interactions suggested from the previous empirical studies are no longer statistically significant. Also, the inclusion of some other interactions, for example, between parental supervision and ethnic type (McLeod et al., 1994) and between single-parent household and poverty (Eamon, 2002) did not statistically significantly improve the model fit. Since all possible pairs of independent variables are included to be tested for interaction effects, some significant interaction effects that have not been frequently suggested from the previous studies are found from this study, namely the interaction between low bond with school and illegal drug use.

Although a significant interaction is found in multinomial logistic model, the interpretation of the relationship between ASB and each independent variable in model 4 needs to be made with caution. As the inclusion of the interaction terms in the model changes the relationship between each independent variable and dependent variable as explained above.

7.2.2. Multivariate Poisson regression analyses

Table 7.3 shows the multivariate Poisson regression analyses results. The LR test results (in the first line at the bottom) show that the inclusion of the explanatory variables in each model significantly improves the model fit in comparison to the null model without any predictors. The LR test result between models 2 & 3 shows that the inclusion of the socio-demographic variables creates a significant improvement in the fit of model 3. The LR test between models 1 & 3 also indicates that the inclusion of the behavioural variables results in a statistically significant improvement in the fit of model 3. The LR test between models 3 & 4 also indicates that the inclusion of the interaction variables results in a statistically significant improvement in the fit of model 4.

Column *B* presents the estimated Poisson regression coefficients for the model given that the other variables in the model are held constant, which can be interpreted as follows: for a unit increase in the explanatory variable, the difference in the logs of the expected counts is predicted to change by the respective regression coefficient.

Table 7.3 Multivariate Poisson regression analyses between antisocial behaviour and individual and family level predictors amongst young people at age 14 in England and Wales

	Model 1&2					Model 3					Model 4				
	B	95% CI	SE	Z	IRR	B	95% CI	SE	Z	IRR	B	95% CI	SE	Z	IRR
Socio demographic factors															
	<i>Model 1</i>														
Male	0.5 ***	0.4 - 0.6	0.0	13.1	1.66	0.4 ***	0.3 - 0.5	0.0	9.5	1.51	0.6 ***	0.4 - 0.7	0.1	8.4	1.76
Ethnic minority	0.1	0.0 - 0.2	0.1	1.7	1.09	0.1 **	0.0 - 0.2	0.1	2.7	1.15	0.3 **	0.1 - 0.4	0.1	3.5	1.29
Low household income	0.1 **	0.0 - 0.1	0.0	2.9	1.05	0.0 *	0.0 - 0.1	0.0	2.5	1.04	0.1 **	0.0 - 0.1	0.0	2.9	1.04
Social housing	0.3 ***	0.2 - 0.4	0.0	5.8	1.34	0.1	0.0 - 0.2	0.0	1.5	1.08	0.1 *	0.0 - 0.2	0.0	2.6	1.12
Single-parent household	0.2 ***	0.1 - 0.3	0.0	4.8	1.25	0.0	-0.1 - 0.1	0.0	-0.5	0.98	0.0	-0.1 - 0.0	0.0	-1.0	0.97
Behavioural & other factors															
	<i>Model 2</i>														
Illegal drugs	0.1 ***	0.0 - 0.1	0.0	3.9	1.10	0.1 ***	0.1 - 0.1	0.0	4.7	1.11	0.4 ***	0.3 - 0.5	0.1	8.4	1.58
Victim of ASB	0.3 ***	0.2 - 0.3	0.0	16.0	1.32	0.3 ***	0.2 - 0.3	0.0	15.0	1.31	0.5 ***	0.4 - 0.6	0.0	11.1	1.68
High risk taking	0.8 ***	0.5 - 1.0	0.1	6.1	2.20	0.4 **	0.1 - 0.7	0.1	2.9	1.51	0.3 *	0.0 - 0.5	0.1	2.0	1.26
Low bond with school	0.1 ***	0.1 - 0.1	0.0	10.2	1.07	0.1 ***	0.1 - 0.1	0.0	10.8	1.07	0.1 ***	0.1 - 0.1	0.0	10.9	1.12
Drug taking friends	0.3 ***	0.2 - 0.4	0.0	7.7	1.33	0.3 ***	0.2 - 0.4	0.0	8.2	1.36	0.7 ***	0.5 - 0.9	0.1	7.6	2.04
Friends with school trouble	0.3 ***	0.2 - 0.3	0.0	8.4	1.29	0.2 ***	0.1 - 0.3	0.0	6.8	1.23	0.3 ***	0.2 - 0.4	0.0	7.6	1.34
Low parental supervision	0.1 ***	0.1 - 0.2	0.0	13.9	1.15	0.1 ***	0.1 - 0.1	0.0	12.4	1.13	0.3 ***	0.2 - 0.3	0.0	10.2	1.30
Interactions															
Low supervision*Illegal drugs											0.0 ***	0.0 - 0.0	0.0	-3.6	0.97
Low supervision*Victim of ASB											0.0 ***	0.0 - 0.0	0.0	-3.9	0.97
Low supervision*Low bond with school											0.0 ***	0.0 - 0.0	0.0	-3.5	0.99
Victim of ASB*Low bond with school											0.0 *	0.0 - 0.0	0.0	-2.4	0.98
Victim of ASB*Drug taking friend											-0.1 **	-0.1 - 0.0	0.0	-3.3	0.93
Drug taking friend*Illegal drugs											-0.1 ***	-0.1 - 0.0	0.0	-3.5	0.92
Drug taking friend*Low bond with school											0.0 **	0.0 - 0.0	0.0	-2.7	0.97
Ethnic minor*Social housing											-0.3 **	-0.5 - -0.1	0.1	-3.0	0.77
Male*School trouble friend											-0.2 ***	-0.3 - -0.1	0.1	-3.5	0.85
^a Likelihood ratio (LR) test (df)	M1 9174 (5)***		M2 69014 (7)***				72192 (12)***				74386 (21)***				
LR test between M1&3, M2&3, 3&4							62478 (7)*** ^b		3177 (5)*** ^c		2194 (9)*** ^d				
N of observations	M1 8735		M2 6360				6220				6220				

Note: Incorporated independent variables in each model: Model1 (Socio demographic) Model2 (Behavioural) Model3 (Model1+2 after multicollinearity test) Model4 (Model3 + interactions), *p<.05 **p<.01 ***p<.001, B=coefficient, IRR= incidence rate ratios, CI= 95% confidence interval, SE= Robust Standard Error, a-null model as a reference, b-model1 as a reference, c-model2 as a reference, d-model3 as a reference, Source: MCS Wave 6 (author's analysis, weighted)

Since these coefficients are the logs of the expected counts, they are often difficult to interpret, so the coefficients in a Poisson regression are often converted into incidence rate ratios (*IRR*), which are presented in column *IRR*.⁶⁴ *IRR* could be interpreted as follows; for example the *IRR* for males (1.51) in model 3 (Table 3) suggests that the ASB increased by 51% with a unit increase in gender, i.e., going from 0 (female) to 1 (male), while all of the other explanatory variables are held constant.

Similar to the result of the multivariate multinomial logistic regression, most of the socio-demographic and behavioural predictors in models 1 and 2 predict ASB at a statistically significant level. In Model 3, all of the predictors of ASB except for being in a single-parent household predict ASB at a significant level. The strength of each relationship is summarised by the incident rate ratio (*IRR*). For example, compared to girls, boys are expected to have a 51% higher count of ASB. Compared to others, ethnic minority respondents are expected to have a 15% higher count of ASB. In model 3, stronger relationships are found between ASB and the following factors: being male (*IRR*=1.51), risk taking (*IRR*=1.51), having drug taking friends (*IRR*=1.36) and being a victim of ASB (*IRR*=1.31) compared to other risk factors in the model.

In model 4, nine pairs of significant interactions are included. A significant interaction between low parental supervision and behavioural variables (namely being a victim of ASB, low bond with school and illegal drug use), between illegal drug use and drug taking friends, between being a victim of ASB and two variables (low bond with school and drug taking friend), between being from an ethnic minority and social housing, between being male and friends with school trouble, and between a low bond with school and having drug taking friends, are found to be significant in the multivariate Poisson regression.

The significant interaction effects can be interpreted as follows. For example, the effect of being from an ethnic minority on ASB is reduced by social housing (*IRR*=0.77). In other words, young people from an ethnic minority group are more likely to engage in ASB but the effect of ethnicity on ASB gets smaller when young people live in social housing compared to those whose household own their property outright. Also, a unit increase in low bond with school also reduces the effects of having drug taking friends (*IRR*=0.97) on ASB. This means that young people are more likely to engage in ASB, for example, when they have friends who take drugs; however, the gap between young people who have friends with drug taking experience and those who do not reduces among young people who have a low bond with school.

⁶⁴ The Incidence rate ratio could be obtained by exponentiating the Poisson regression coefficient. For more information on the interpretation of *IRR*, please refer to section 7.1.

The inclusion of interactions in the model also requires a revised interpretation of the relationships between each independent variable and the dependent variable. For example, the incident rate ratio of males in model 4 could be interpreted as follows: boys who do not have friends who make trouble in school are expected to have an 80% ($IRR=1.78$) higher rate of ASB compared to girls. With the inclusion of the interaction terms in model 4, the IRR of several variables changes but not dramatically and the relationship between social housing and ASB gains statistical significance ($p<.05$).

Some interactions that are found to be significant in previous studies on ASB (i.e., the interaction between gender and parenting style, see section 7.2.1) are not found to be significant in the multivariable Poisson regression model. Some significant interactions that have not been frequently suggested from the previous studies are found from the Poisson regression analysis, which are the nine interactions included in model 4 (Table 7.3).

7.2.3. Discussions of the findings of the multivariate regression analysis model

In order to answer research questions 1-1 and 1-2, a series of multivariate multinomial logistic and Poisson regressions are conducted in section 7.2. The significant results of the LR test between model 1 and model 3, and model 2 and model 3 in both the multivariate multinomial logistic regressions and the multivariate Poisson regressions demonstrate that there are significant individual and family level effects on antisocial behaviour among young people (Research question 1-1). Furthermore, the test statistic of the significance of the regression coefficients in model 3 allow us to identify individual and family level predictors that significantly influence antisocial behaviour. All of the predictors except low household income, single-parent household and high risk taking predicted antisocial behaviour in the multivariate multinomial logistic regressions (Table 7.2). The multivariate Poisson regression analyses result (Table 3) shows a similar but slightly different result. The low household income and high risk taking variables did not predict antisocial behaviour in the multivariate multinomial logistic regression but did in the multivariate Poisson regression. On the other hand, the social housing variable did not predict the ASB variable in the multivariate Poisson regression but did in the multivariate multinomial logistic regression.

The significant results of the LR test between model 3 and model 4 in both the multivariate multinomial logistic regressions and the multivariate Poisson regressions demonstrate that there are significant interaction effects between individual and family level factors in predicting antisocial behaviour (Research question 1-2). Furthermore, the test statistic of the significance of the regression coefficients in model 4 allowed us to identify the significant interactions

between the individual and family level predictors. One significant interaction was found in multinomial logistic regression (Low bond with school * drug use) while several interactions are found in the Poisson regression (see Table 7.3).

Most of the findings from this chapter coincide with the results from the previous studies that have empirically tested the relationship between antisocial behaviour and behavioural risk factors. For example, both the multinomial logistic and Poisson regression analyses of the link between ASB and illegal drug use support the results from previous empirical studies that have revealed a significant relationship between ASB and illegal drug use or substance abuse (D'Amico et al., 2008; Johnston et al., 1993). From a psychopharmacological view, the increased risk of perpetrating severe ASB could be the result of intoxication from the illegal drug use (Goldstein, 1985; Parker and Auerhahn, 1998). Or it could be that young people who use alcohol or other substances engage in crime to obtain resources to buy or get alcohol or illegal drugs (Goldstein, 1985), although these relationships could not be defined from this analysis. At the same time, some other previous studies have shown an insignificant relationship between ASB and illegal drug use or substance abuse (Dahlberg, 1998; Felson et al., 2008) or have shown the effects of delinquency on illegal drug use (Van den Bree and Pickworth, 2005; Mason et al., 2007). Although the significant link between ASB and illegal drug use and other individual level explanatory variables is found in both the multinomial logistic regression and Poisson regression analyses, caution needs to be exercised when interpreting these results, since different predictions about the direction of the causality could be produced depending on different perspectives (Young et al., 2007).

The multinomial logistic and Poisson regression analyses result between ASB and both variables measuring peer influence, namely drug taking friends and friends with school trouble, also back up the results from the previous empirical studies that revealed the significance of peer influence on ASB. The variables that were used by this study to measure peer influence are different from the variables from the previous studies, which used, for example, deviant peer groups (Jaffee et al., 2012; Henry et al., 2001) or peer pressure (Eamon, 2002; Steinberg, 2000) but the result still coincide with those of previous studies. For example, from their empirical research, Eamon (2002) found that peer pressure significantly influenced ASB among adolescents and Henry et al. (2001) found a significant relationship between peer violence and future individual violent and nonviolent delinquency.

Other results of multivariate multinomial and Poisson regressions on the relationship between ASB and behaviour factors also support the results from previous studies that revealed the following relationships: between victimisation and delinquency (Cuevas et al., 2007); between risk taking and ASB (Herrenkohl et al., 2000); between school bond and delinquency (Liljeberg

et al., 2011; Simons-Morton et al., 1999); and between low parental supervision and ASB (Waller et al., 2013; Deković et al., 2003).

Some socio-demographic risk factors that have been suggested to be causes of ASB in previous studies also predicted ASB at a significant level. The significant relationship between gender and ASB (Jacobson et al., 2002; Deković et al., 2004); and between ethnic status and ASB (Atzaba-Poria and Pike, 2007; Schoot et al., 2010) are both supported by the multinomial logistic and Poisson regression analysis results of this study. Meanwhile, the relationship between living in social housing and ASB is significant only in the multinomial logistic regression analysis (see Table 7.2 above) and the relationship between single-parent household status and ASB is significant only in the Poisson regression analysis (see Table 7.3 above) Although the relationship between ASB and some socio-demographic risk factors is supported by these analyses, caution needs to be exercised when interpreting the results, since different predictions and variables are used compared to the previous studies. For example, in Atzaba-Poria and Pike's (2007) study, Indian children were used to measure ethnic minority status in comparison to English peers, whereas in this study non-White children were used to create the ethnic minority group.

One of the socio-demographic risk factors and two of the behavioural risk factors in the model did not predict ASB either in the multivariate multinomial logistic or the Poisson regression analyses at a statistically significant level. The risk factor for ASB, namely single-parent household which have been suggested from the previous studies to be a predictor of ASB (Eamon, 2002; Martens, 2000; Rutter et al., 1998; Romero et al., 2001) did not predict ASB either in the multivariate multinomial logistic or the Poisson regression analyses in the MCS6. There are several possible reasons that might have caused this discrepancy. First, it could be simply that those risk factors do not increase the risk of perpetrating severe ASB with the sample of this study. Second, the risk factors that this study used may have been measured differently from the previous studies, which could have led to a different result. Third, the findings may differ because different studies have used different types of ASB or delinquency variables. The relationship between ASB and risk factors may differ depending on the type of ASB and the type of statistical test used in different studies. For example, although not many, there are still some differences between the multinomial logistic and Poisson regression analyses results in this study. The robustness of these relationships may depend on the subtypes of antisocial under investigations and the designs of the study.

Moreover, not all previous studies have presented consistent results in addressing the relationship between ASB and predictor variables. For example, the ethnicity variable significantly predicted ASB in Atzaba-Poria and Pike's (2007) study where the ethnic group

was divided into Indian and English. This study also found a link between ethnicity and ASB where the ethnic minority group was created by combining Black and Black British children. On the other hand, in Deković et al.'s (2004) study, which divided the ethnic group into Dutch, Moroccan, Turkish and Surinamese, the relationship between ethnicity and ASB was not significant. Even though studies on ASB try to address similar relationships, they do not always test the same relationship. Therefore, the differences in the results might have been caused by differences between the measures, characteristics of the sample, or in the statistical methods adopted in each study. Therefore, caution needs to be exercised when comparing the test results between different studies.

7.3. Conclusion

This chapter aimed to measure individual and family level effects on antisocial behaviour among young people and to further examine the interaction effects between individual and family level factors in predicting antisocial behaviour. As discussed in section 7.2.3, most of the findings of this chapter support the relationship between antisocial behaviour and individual and family level explanatory variables that are suggested from previous studies on antisocial behaviour. In addition, the findings from this chapter also confirm the hypotheses of this study that ***individual and family level factors have significant effects on antisocial behaviour among young people*** and that ***there are interactions between individual and family level factors in predicting antisocial behaviour***.

As social ecological theory (see Chapter 4) has pointed out, antisocial behaviour among young people could be better understood by considering the interrelated relationship between individual, family and wider area level and social effects. In this chapter, among the several ecological systems, the effect of the immediate system (microsystem) in which young people actively participate in antisocial behaviour (e.g., family and friend) were first tested in model 3, together with the effects of individual level conditions (e.g., gender and illegal drug use). Although individual behavioural factors such as illegal drug use (severe RRR=3.1) tended to have stronger effects on ASB, some factors of the microsystem such as friends with school trouble (RRR=1.9) also showed noticeable effects on ASB (model 3). This suggests that when developing intervention programmes to reduce antisocial behaviour among young people, the immediate system (e.g., family and friends) surrounding young people needs to be considered together with personal characteristics.

Another interesting finding from model 3 is the significant relationship between being a victim of antisocial behaviour and the dependent variables. As young people who have been a victim of antisocial behaviour are more likely to engage in antisocial behaviour, a strict separation

between victims and perpetrators is difficult. However, risk focused interventionism, which has been largely retained in the government's recent approach to antisocial behaviour (see Chapter 2), tries to draw a line between the victims and the perpetrators and tries to responsabilise the young individuals. Although some young people engage in antisocial behaviour, many of them also suffer from antisocial behaviour. This finding suggests that interventions on antisocial behaviour need to be supportive and protective, since young people who have engaged in antisocial behaviour may also be the (future or past) victims of antisocial behaviour (discussed more in Chapter 9).

In addition, some important findings are found in model 4, which tested the interactions between two or more settings in which a young person participates (the mesosystem).⁶⁵ In fact, testing the interaction effects allowed us to obtain an extended view in understanding antisocial behaviour. For example, regarding a friend effect on antisocial behaviour, when young people have more friends who cause trouble at school, they are more likely to engage in antisocial behaviour compared to young people without any friends who cause trouble at school. However, the significant interactions between having friends who cause trouble at school and gender show that the effects of friends who cause trouble at school are greater for girls compared to boys. This suggests that reducing the number of friends who cause trouble at school may reduce antisocial behaviour among girls; however, that would have less effect on boys.

In this chapter, the focus was on the immediate effects of individual and family level factors on antisocial behaviour and the interactions between them. In the next chapter, this study further examines the relationship between individual, family and neighbourhood level effects on antisocial behaviour among young people. A series of multilevel multinomial logistic and Poisson regression analyses are conducted to address neighbourhood level effects on ASB.

⁶⁵ The effects of the exosystem are measured in Chapter 8, which addresses the area level effects on antisocial behaviour and tests the cross-level interactions between individual and family level factors and neighbourhood factors.

Chapter 8. Neighbourhood level analysis

This chapter aims to measure neighbourhood level effects on antisocial behaviour among young people and to investigate the interactive relationships between individual and family level (level-1) and neighbourhood level (level-2) factors in understand antisocial behaviour. As discussed in Chapter 4, by adopting the social ecological view in the measurement model, this study assumes that different level of independent variables is inter-connected, and they communicate within the wider context of social ecology where antisocial behaviour arouses. In order to conduct neighbourhood level analysis, eight neighbourhood level structural variables are derived using 2011 Census data, namely ethnic minority population, single-parent household, low occupational status, unemployment, own housing outright, housing deprivation (shared accommodation and no-central heating), and health deprivation (bad health). The neighbourhood perception variable is created by using the unsafe neighbour variable from the MCS data, which is aggregated to create the LSOA level unsafe neighbourhood variable.⁶⁶

To examine the hypothesis of this study that not only individual and family level factors but also ***neighbourhood level conditions that have effects on antisocial behaviour among young people even after controlling for individual and family level covariates***, several multilevel multinomial logistic and Poisson regression analyses are carried out. Multilevel models are adopted in this study since they are designed to analyse variables from more than one level simultaneously utilising a statistical model that properly accounts for the various dependencies (Hox, 2010).⁶⁷

Before directly answering the research questions, section 8.1 provides the reasons for using multilevel modelling rather than the simple-level regression approach by implementing a variance component model. Sections 8.2 and 8.3 reflect the two research questions. In Section 8.2, random intercept models are used to address ***whether the likelihood of antisocial behaviour among young people varies significantly across neighbourhoods*** after taking into account level-1 factors (Research Question 2-1) and ***which neighbourhood level characteristics are significantly associated with neighbourhood variation*** in antisocial behaviour among young people (Research Question 2-2). The random intercept model allows the intercept of the group regression lines to vary randomly across groups, which means that the intercept for a specific neighbourhood will be higher or lower than the overall intercept.

⁶⁶ Please refer to Chapter 5 for more information on the development of each neighbourhood level variable.

⁶⁷ See Appendix 5.3 for the further details on the analysis strategy (multilevel modelling) of this study.

In section 8.3, multilevel random effects models are used to test *whether the effects of level-1 characteristics on antisocial behaviour among young people vary across neighbourhoods* (Research Questions 3-1). It further examines *which neighbourhood level characteristics significantly explain the variation in the effects of level-1 characteristics on antisocial behaviour across different neighbourhoods* (cross-level interactions) (Research Question 3-2). Random coefficient modelling is used since it allows the slope to vary randomly across neighbourhoods.

8.1. Preliminary analysis: Variance component model

Before directly analysing the data for the research questions, the intraclass correlations (ICC) are calculated and the significance of the random variance of ASB is tested using the likelihood ratio test in the variance component models.⁶⁸ This is an essential process as it provides information in deciding whether the research questions are best answered by adopting the multilevel approach rather than simple-level regression models (Kim, 2004). The presence of hierarchical or clustered datasets is not a sufficient condition to use the multilevel approach. “If there is no variability in response variables across higher-level units, then the data can be analyzed using traditional methods exclusively on the individual level” (Sagan, 2013, p.583). Thus, the necessity of a multilevel approach needs to be checked first by calculating the ICC, which calculates the proportions of the variance that is explained by the grouping structure in the population.

Table 8.1 presents the ICCs for the variance component models. The intraclass correlation, which indicates the proportion of neighbourhood variance compared to the total variance (e.g., the sum of the within- and between-neighbourhood variances), could be defined using equation [5.4].⁶⁹ The ICC calculated for the multinomial logistic model and Poisson regression model is .29 and .56 respectively. In other words, 29% (ICC=.29) and 56% (ICC=.56) of the variance in ASB can be attributed to differences between neighbourhoods in the multilevel multinomial logistic model and in the multilevel Poisson regression model respectively.

⁶⁸ Variance component model is the special case of the random intercept model with no covariates. For more information on the variance component model see Appendix 5.3.

⁶⁹ Equation [5.4] in Appendix 5.3 is as follows:

$$ICC = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_e^2}$$

Table 8.1 Intraclass correlation of variance component models

	Multinomial Logistic Regression	Poisson Regression
Variance		
Between neighbourhood	1.36	1.07
Within-neighbourhood (between individuals)	3.29	.85
Intra-class correlation	.29	.56

Note: N of observations (groups): 8697 (4753)

Source: Sixth survey of the MCS (University of London et al., 2019), Sixth survey of the MCS Geographical Identifiers (University of London et al., 2017) and 2011 Census aggregated data (Office for National Statistics et al., 2017) (author's analysis: weighted)

The requirement for a multilevel modelling approach can be further examined by testing the null hypothesis that there are no group differences. This can be achieved by comparing the null single-level and null multilevel regressions (multinomial logistic and Poisson) in a likelihood ratio (LR) test. The LR test statistics are calculated as $LR = -2 \log L_1 - (-2 \log L_2)$. L_1 and L_2 are the likelihood values of the single-level and multilevel models respectively. "The LR for a model is (proportional to) the probability of obtaining the observed data (y values for individuals in the sample) if that model were true. Thus, the higher the likelihood, the better the fit of the model to the data" (Steele, 2008a, p.8). A comparison is made between the LR and a Chi-squared distribution with *df* equal to the number of extra parameters in the more complicated model (Steele, 2008).

Table 8.2 presents the LR test between the null random intercept models and the null single-level models without predictors. It shows the test results for both the multinomial logistic regression and the Poisson regression models.

Table 8.2 Testing significance of random variance of antisocial behaviour in variance component models

Statistics	-2ΔLL	(df)	
Multinomial Logistic regression	868	(1)	***
Poisson regression	3380	(1)	***

Note: *** $p < .001$, N of observations (groups): 8697 (4753)

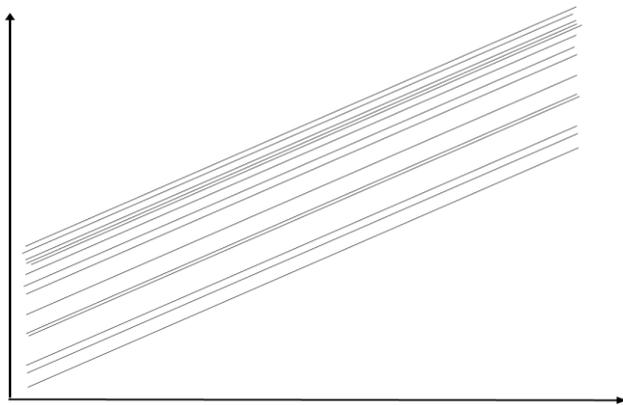
Source: Sixth survey of the MCS (University of London et al., 2019), Sixth survey of the MCS Geographical Identifiers (University of London et al., 2017) and 2011 Census aggregated data (Office for National Statistics, 2017) (author's analysis: weighted)

The Chi-square result shows that including the random intercept term into the single-level multinomial logistic model ($\chi^2(1) = 8684, p < .001$) and single-level Poisson regression model ($\chi^2(1) = 3380, p < .001$) improves the overall model fit. In summary, the results of both two statistical analyses suggest the grounds for using a multilevel approach which means that the research questions can be appropriately answered by conducting the multilevel models rather than single-level regression models (Kim, 2004).

8.2. Research Questions 2: Random intercept multilevel model

Research questions 2-1 and 2-2 (stated below) are addressed by using random intercept models, which enable the discovery of the extent to which differences between individuals' ASB are due to their residence in neighbourhoods. It is referred to as a random intercept model since the intercept of the group regression lines is allowed to vary randomly across neighbourhoods where the overall slope coefficient is shared by all neighbourhoods. This simply denotes that the intercept is allowed to take on different values from a distribution as presented in Figure 8.1. In other words, only the intercept coefficient, β_{0j} (see Equation [5.5])⁷⁰ is considered to be randomly distributed across the neighbourhoods but the slope coefficient, β_{1j} , is restricted to have fixed effects for all neighbourhoods (Hox, 2010). Thus, multilevel random intercept models allow this study to find out the extent to which differences between individuals in ASB are explained by neighbourhood characteristics while level-1 predictors are held constant.

Figure 8.1 Illustration of random intercept in a multilevel model



8.2.1. Research Question 2-1: Random intercept multilevel model

Question 2-1: Does the likelihood of antisocial behaviour among young people vary across different neighbourhoods while individual and family level characteristics are held constant?

To address Research Question 2-1, this study tests the significance of the variance of the random intercept in model 5 (multilevel model incorporating level-1 variables) using the LR test. Table 8.3 presents the LR test result between the multilevel and single-level multinomial logistic and Poisson regression models.

⁷⁰ Equation [5.5] in Appendix 5.3 is as follows: $Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + e_{ij}$

Table 8.3 Testing significance of random variance of antisocial behaviour in random intercept models

	-2ΔLL	(df)	
Multinomial logistic regression model	465	(12)	***
Poisson regression model	529	(12)	***

Note: *** $p < .001$, N of observations (groups): 6021 (3678)

Source: Sixth survey of the MCS (University of London et al., 2019), Sixth survey of the MCS Geographical Identifiers (University of London et al., 2017) and 2011 Census aggregated data (Office for National Statistics, 2017) (author's analysis: weighted)

The LR test result of the multinomial logistic ($\chi^2(12) = 465, p < .001$) and Poisson ($\chi^2(12) = 529, p < .001$) regression analysis suggests that the prevalence of ASB varies across the neighbourhoods while level-1 variables are held constant. The result suggests further analysis to address which neighbourhood factors are associated with the prevalence of antisocial behaviour.

8.2.2. Research Question 2-2: Random intercept multilevel model

Question 2-2: What are the neighbourhood characteristics that are associated with the neighbourhood level variation in antisocial behaviour among young people?

Two kinds of statistical tests are used to address Research Question 2-2: the LR test between model 5 (Individual + Family) and model 7 (model 5 + Neighbourhood); and the Wald test of significance for the regression coefficients of the neighbourhood variables in model 7. The LR test is conducted to see if neighbourhood level variables as a whole improve the overall model fit when included in model 7. In addition, the Wald test is conducted to see if there is a significant association between antisocial behaviour and each neighbourhood variable. These test results are presented in Tables 8.4 and 8.5.

Table 8.4 presents the random intercept multinomial logistic regression analysis results. Model 5 shows the multilevel multinomial logistic regression results when only individual and family level (level-1) variables are included in the model. In model 6, only neighbourhood level (level-2) variables are included as independent variables. Model 7 includes all of the level-1 and level-2 predictors. The LR test between model 5 and model 7 at the bottom of Table 8.4 shows that the inclusion of neighbourhood level variables in the model improves the overall model fit ($\chi^2(9) = 5628, p < .01$). In model 5 when only level-1 predictors are included, all of the variables except social housing, single-parent household, illegal drugs and high risk taking show a significant relationship with minor ASB. Similarly, all of the variables except low household income, social housing, single-parent household, high risk taking show a significant relationship with minor ASB.

Table 8.4 Random intercept multinomial logistic regression models

Independent Variables		Model 5		Model 6		Model 7	
		<i>B</i> (95% CI)	<i>RRR</i>	<i>B</i> (95% CI)	<i>RRR</i>	<i>B</i> (95% CI)	<i>RRR</i>
Never versus Minor							
Individual & Family level Factors	<i>Socio demographic factors</i>						
	Male	1.03 (0.84-1.23) ***	2.82			1.04 (0.84-1.24) ***	2.84
	Ethnic minority status	0.67 (0.34-0.99) ***	1.95			0.61 (0.26-0.96) **	1.85
	Low household income	0.09 (0.01-0.17) *	1.10			0.06 (0.03-0.16)	1.07
	Social housing	-0.01 (-0.30-0.29)	0.99			-0.01 (-0.31-0.29)	0.98
	Single-parent household	-0.07 (-0.33-0.19)	0.93			-0.06 (-0.22-0.20)	0.94
	<i>Behavioural factors</i>						
	Illegal drugs	0.14 (-0.47-0.74)	1.15			0.15 (-0.46-0.76)	1.16
	Victim of ASB	0.85 (0.69-0.92) ***	2.24			0.81 (0.71-0.97) ***	2.27
	High risk taking	0.25 (-0.42-0.92)	1.28			0.23 (-0.44-0.9)	1.26
	Low bond with school	0.14 (0.11-0.18) ***	1.16			0.15 (0.11-0.18) ***	1.16
	Drug taking friends	0.77 (0.52-1.01) ***	2.16			0.78 (0.54-1.02) ***	2.20
	Friends with school trouble	0.26 (0.08-0.44) **	1.30			0.26 (0.08-0.44) **	1.30
	Low parental supervision	0.27 (0.21-0.34) ***	1.32			0.28 (0.21-0.34) ***	1.33
	Neighbourhood level factors	<i>Structural factors</i>					
Ethnic minority status				-0.01 (-0.01-0.01)	1.00	0.00(-0.01-0.02)	1.00
Single-parent household				0.18 (-0.20-0.57)	1.24	0.07(-0.54-0.69)	1.07
Low level occupation				0.00 (-0.00-0.01)	1.01	-0.00(-0.01-0.01)	0.99
Unemployment				-0.21 (-0.46-0.05)	0.81	0.11(-0.31-0.53)	1.12
Own outright				-0.01 (-0.02-0.00) **	0.99	-0.01(-0.02-0.00)	0.99
<i>Housing deprivation</i>							
Shared accommodation				0.02 (-0.06-0.09)	1.02	-0.03(-0.17-0.10)	0.97
No-central heating				-0.01 (-0.03-0.02)	1.00	0.04(-0.01-0.09)	1.04
<i>Health deprivation</i>							
Bad health				-0.02 (-0.13-0.10)	0.91	0.00(-0.18-0.18)	1.01
<i>Neighbourhood perception</i>							
Unsafe Neighbourhood			-0.00 (-0.28-0.28)	1.04	-0.00(-0.52-0.52)	0.99	

Table 8.4 (continued)

Never versus Severe	Independent Variables	Model 5		Model 6		Model 7	
		<i>B</i> (95% CI)	<i>RRR</i>	<i>B</i> (95% CI)	<i>RRR</i>	<i>B</i> (95% CI)	<i>RRR</i>
<i>Individual & Family level Factors</i>	<i>Socio demographic factors</i>						
	Male	0.68 (0.27-1.08) **	1.97			0.71 (0.30-1.11) **	2.04
	Ethnic minority status	0.68 (0.03-1.33) *	1.99			0.51 (-0.25-1.27)	1.67
	Low household income	0.13 (-0.03-0.29)	1.14			0.01 (-0.18-0.19)	0.01
	Social housing	0.05 (-0.53-0.64)	1.06			0.01 (-0.57-0.61)	1.01
	Single-parent household	0.05 (-0.41-0.51)	1.06			0.08 (-0.37-0.55)	1.09
	<i>Behavioural factors</i>						
	Illegal drugs	1.28 (0.68-1.88) ***	3.61			1.28 (0.68-1.87) ***	3.61
	Victim of ASB	0.99 (0.78-1.21) ***	2.71			1.04 (0.83-1.25) ***	2.84
	High risk taking	0.40 (-1.07-1.86)	1.50			0.31 (-1.15-1.78)	1.38
	Low bond with school	0.16 (0.08-0.24) ***	1.18			0.16 (0.08-0.24) ***	1.18
	Drug taking friends	1.06 (0.67-1.44) ***	2.89			1.11 (0.72-1.49) ***	3.04
	Friends with school trouble	0.62 (0.27-0.97) **	1.86			0.61 (0.25-0.96) **	1.85
	Low parental supervision	0.47 (0.35-0.58) ***	1.60			0.47 (0.36-0.58) ***	1.61
<i>Neighbourhood level factors</i>	<i>Structural factors</i>						
	Ethnic minority status			-0.02 (-0.03-0.00) *	0.99	0.22 (-0.01-0.05)	1.02
	Single-parent household			0.35 (-0.31-1.02)	1.42	-0.36 (-1.47-0.74)	0.69
	Low level occupation			-0.00 (-0.01-0.01)	1.00	-0.01 (0.03-0.01)	0.99
	Unemployment			0.26 (-0.21-0.73)	1.30	0.89 (0.15-1.62) *	2.44
	Own outright			-0.01 (-0.02-0.00) *	0.99	-0.00 (-0.02-0.02)	0.99
	<i>Housing deprivation</i>						
	Shared accommodation			-0.17 (-0.34-0.00)	0.84	-0.14 (-0.57-0.28)	0.87
	No-central heating			0.06 (0.01-0.12) **	1.07	0.12 (0.03-0.21) **	1.13
	<i>Health deprivation</i>						
Bad health			0.35 (0.12-0.58) *	1.42	0.56 (0.26-0.87) ***	1.77	
<i>Neighbourhood perception</i>							
Unsafe Neighbourhood			0.08 (-0.56-0.72)	1.08	-0.83 (-2.09-0.42)	0.43	
Log likelihood		-4156		-8208		-4129	
Likelihood ratio test (<i>df</i>)		465 (12) *** a		839 (9) *** a		445 (21) *** a	54 (9) ** b
N of observations (groups)		6021 (3678)		8697 (4753)		6021 (3678)	

Note: a-simple (non-multilevel) multinomial logistic regression model as a reference, b-Model 5 as a reference, *p<.05 ** p<.01 ***p<.001, B=coefficient, CI= 95% confidence interval, RRR=Relative Risk Ratio, Incorporated independent variables in each model: Model 5 (Individual & Family), Model 6 (Neighbourhood), Model 7 (Model 5 + Model 6)

Source: Sixth survey of the MCS (University of London et al., 2019), Sixth survey of the MCS Geographical Identifiers (University of London et al., 2017) and 2011 Census aggregated data (Office for National Statistics, 2017) (author's analysis: weighted)

The relationship between the level-1 predictors and ASB has already been tested with a single-level multivariate multinomial logistic model (model 3 in Chapter 7). However, in model 5, neighbourhood variation was introduced by using multilevel modelling. The introduction of neighbourhood level variation slightly altered the relationship between some of the predictors and ASB. When neighbourhood level variation was included in model 5, some of the relationships became significant (e.g., between low household income and minor ASB) while some of the relationships became insignificant (e.g., between social housing and severe ASB). This finding shows that when neighbourhood level variation was not allowed in model 3, it could mislead us into assuming that young people living in social housing are more likely to be involved in severe ASB. However, this relationship became insignificant when severe ASB was allowed to vary across neighbourhoods in model 5. This suggests that it is not that young people living in social housing are more likely to be involved in ASB; rather, it is more likely that neighbourhood housing deprivation raises the likelihood of ASB among young people.

In model 6, when only neighbourhood level variables were included, own outright predicted both minor and severe ASB at a statistically significant level ($p < .05$) while ethnic minority status, no-central heating and bad health only predicted severe ASB. This result suggests that the risk of perpetrating both minor and severe ASB decreases when young people are living in an area with a high rate of own outright (Minor RRR=.99, $p < .01$, Severe RRR=.99, $p < .05$) when the individual and family level covariates are not held constant in the model. This means that for a one percentage point increase in rates of owning housing outright, the risk of committing minor and severe ASB decreases by 1%. Also, for a one percentage point increase in no central heating and bad health, the risk of committing severe ASB increases by 7% (RRR=1.07, $p < .01$) and 42% (RRR=1.42, $p < .05$) respectively, while a one percentage point increase in ethnic minority status results in the risk of committing severe ASB decreasing by 1% (RRR=.99, $p < .05$).

Model 7 shows the random intercept multinomial logistic regression results when all of the level-1 and level-2 predictors were included in the model. The inclusion of level-2 variables made a slight change to the coefficients and relative risk ratios of the level-1 predictors but did not make a change to the significant relationship between the level-1 predictors and the dependent variable (both minor and severe ASB) except for low household income (predicting severe ASB), which became insignificant in Model 7. In other words, most of the level-1 predictors that show significant relationships with ASB in model 5 also show a significant relationship with the dependent variable in model 7 regardless of the inclusion of level-2 variables. On the other hand, the inclusion of the level-1 predictors noticeably affects the relationship between the neighbourhood level variables and ASB. When the level-1 predictors

are included as control variables in model 7, neighbourhood level housing own outright, which significantly predicts both minor and severe ASB in model 6, becomes non-significant. Neighbourhood level ethnic minority status, which significantly predicts only severe ASB in model 6, also becomes non-significant in model 7, while unemployment, which is insignificant in model 6, becomes significant in predicting severe ASB in model 7. In addition, two neighbourhood level variables (no-central heating and bad health) significantly predict severe ASB in model 6 and model 7.

The relative risk ratio for neighbourhood unemployment ($RRR= 2.44, p<.05$) in model 7 suggests that for a one percentage point increase in the local unemployment rate, the risk of perpetrating severe ASB increases by about 250%, when other explanatory variables in the model are held constant. In other words, when young people are living in areas with high rates of unemployment, the risk of perpetrating severe forms of ASB increases. The relative risk ratio for neighbourhood level no-central heating ($RRR=1.13, p<.01$) suggests that for a one percentage point increase in no-central heating the risk of perpetrating severe ASB increases by 13%. In other words, when young people are living in an area with high rates of housing deprivation (accommodation with no central heating), the risk of perpetrating severe forms of ASB increases. The relative risk ratio for neighbourhood level bad health ($RRR=1.77, p<.001$) suggests that for a one percentage point increase in neighbourhood poor health, the risk of perpetrating severe ASB increases by 77%. In other words, when young people are living in an area with higher rates of bad health, the risk of perpetrating severe ASB increases.

Table 8.5 presents the random intercept Poisson regression analysis results. The LR test between model 5 and model 7 at the bottom of Table 8.5 shows that the inclusion of the neighbourhood level variables in the model improves the overall model fit ($\chi^2(9) = 26, p<.01$). In model 5, when only the level-1 predictors are included, all of the variables except social housing and single-parent household show significant relationships with the frequency of ASB. In model 6, when only neighbourhood level predictors are included, four structural neighbourhood level predictors predicted ASB at a significant level ($p<.05$). Two of the neighbourhood level variables, namely ethnic minority status and own outright, predicted ASB in both the multinomial logistic and Poisson regression models. Meanwhile the other two variables, low occupational level and single-parent household, are significant only in the Poisson model. This implies that some neighbourhood level conditions increase the risk of perpetrating ASB in general, but do not increase the risk of perpetrating minor or severe ASB. This finding from model 6 suggests that the risk of perpetrating ASB increases when young people live in an area with high rates of single-parent households ($IRR=1.25, p<.05$) and households of low level occupational level ($IRR=1.01, p<.05$), while the risk of perpetrating

ASB decreases when young people live in an area with high rates of ethnic minority population ($IRR=.99$, $p<.01$) and high rates of owner occupancy ($IRR=.99$, $p<.05$) when the level-1 covariates are not held constant in the model. Since individual and family level covariates are not included in model 6, the result from this model is presented only for reference. As discussed earlier in this section, the inclusion of the level-1 covariates may influence the relationship between neighbourhood level conditions and ASB (presented in Model 7).

Model 7 shows the random intercept Poisson regression results when all of the level-1 and level-2 predictors are included in the model. Similar to the result of the random intercept multinomial logistic model, the inclusion of level-2 variables in model 5 did not make a dramatic change to the significant relationship between the level-1 predictors and the dependent variable. On the other hand, the inclusion of the level-1 predictors in the model noticeably affected the relationship between neighbourhood level variables and ASB. When the level-1 variables are included as control variables in model 7, four neighbourhood level variables that significantly predicted ASB in model 6 became non-significant, while two neighbourhood level variables (no-central heating and bad health population) became significant.

In the multinomial logistic regression model (Table 8.4), no-central heating and bad health population significantly predict severe ASB in model 6 and model 7, while in the Poisson regression, these variables significantly predict ASB only in model 7 when individual level variables are added to the model. This means that in the multilevel Poisson regression model, neighbourhood level no-central heating and bad health are only significant when the level-1 variables are controlled for. It is difficult to fully explain the reason behind the different results between model 6 and model 7 but difficulties that are inherent in quantitative neighbourhood studies may explain some of them. Failure in accounting for important level-1 factors may cause the over-estimation of neighbourhood level effects. On the other hand, an attempt to separate out neighbourhood effects by controlling for level-1 factors may lead to controlling out important factors of areas that may have effects (Lupton, 2003). In neighbourhood studies, the effects of neighbourhood level deprivation factors are often reduced or disappear after level-1 deprivation measures are controlled for. It may be that the effect of neighbourhood is actually an output of level-1 deprivation, an effect of the current neighbourhood, or an effect of previous neighbourhood the person had lived (Lupton, 2003).⁷¹ An in-depth qualitative approach may help in untangling this complicated relationship between neighbourhoods and ASB and the role of level-1 effects in the relationship and vice-versa.

⁷¹ Difficulties in interpreting neighbourhood studies are discussed further in chapter 9 (discussion chapter).

Table 8.5 Random intercept Poisson regression models

Independent Variables		Model 5			Model 6			Model 7				
		B	(95% CI)	IRR	B	(95% CI)	IRR	B	(95% CI)	IRR		
Individual & Family level Factors	<i>Socio demographic factors</i>											
	Male	0.46	(0.36-0.54)	***	1.58			0.46	(0.36-0.54)	***	1.58	
	Ethnic minority status	0.15	(0.03-0.26)	*	1.16			0.16	(0.02-0.28)	*	1.17	
	Low household income	0.07	(0.04-0.10)	***	1.08			0.05	(0.01-0.89)	*	1.05	
	Social housing	-0.02	(-0.14-0.10)		0.98			-0.02	(-0.13-0.10)		0.98	
	Single-parent household	-0.00	(-0.10-0.09)		1.00			0.01	(-0.08-0.10)		1.01	
	<i>Behavioural factors</i>											
	Illegal drugs	0.15	(0.08-0.21)	***	1.16			0.13	(0.08-0.20)	***	1.16	
	Victim of ASB	0.30	(0.26-0.34)	***	1.35			0.36	(0.26-0.34)	***	1.36	
	High risk taking	0.44	(0.15-0.73)	**	1.56			0.45	(0.15-0.73)	**	1.57	
	Low bond with school	0.08	(0.06-0.09)	***	1.09			0.08	(0.06-0.09)	***	1.08	
	Drug taking friends	0.32	(0.23-0.40)	***	1.38			0.33	(0.24-0.41)	***	1.39	
	Friends with school trouble	0.20	(0.12-0.27)	***	1.23			0.21	(0.13-0.27)	***	1.23	
	Low parental supervision	0.15	(0.12-0.17)	***	1.16			0.15	(0.12-0.17)	***	1.16	
Neighbourhood level factors	<i>Structural factors</i>											
	Ethnic minority status				-0.01	(-0.02--0.00)	**	0.99	-0.00	(-0.01-0.01)		1.00
	Single-parent household				0.23	(0.01-0.44)	*	1.25	0.07	(-0.14-0.27)		1.07
	Low level occupation				0.01	(0.00-0.01)	*	1.01	0.00	(-0.00-0.00)		1.00
	Unemployment				-0.01	(-0.16-0.15)		0.99	0.03	(-0.14-0.19)		1.03
	Own outright				-0.01	(-0.01--0.00)	*	0.99	0.00	(-0.01-0.00)		1.00
	<i>Housing deprivation</i>											
	Shared accommodation				-0.01	(-0.06-0.04)		0.99	-0.01	(-0.06-0.04)		0.99
	No-central heating				0.01	(-0.01-0.03)		1.01	0.03	(0.01-0.05)	**	1.03
	<i>Health deprivation</i>											
Bad health				0.03	(-0.04-0.10)		1.03	0.09	(0.02-0.16)	**	1.10	
<i>Neighbourhood Perception</i>												
Unsafe Neighbourhood				0.22	(-0.03-0.47)		1.25	0.03	(-0.18-0.24)		1.03	
Log likelihood		-6517			-11944			-6514				
Likelihood ratio test (df)		639 (12) *** ^a			3232 (9) *** ^a			615 (21) ***			26 (9) ** ^b	
N of observations (groups)		6032 (3678)			8697 (4753)			6021 (3678)				

Note: a-simple (non-multilevel) Poisson regression model as a reference, b-Model 5 as a reference, *p<.05 **p<.01 ***p<.001, B=coefficient, CI= 95% confidence interval, IRR=incidence rate ratios, Incorporated independent variables in each model: Model 5 (Individual & Family), Model 6 (Neighbourhood), Model 7 (Model 5 + Model 6)

Source: Sixth survey of the MCS (University of London et al., 2019), Sixth survey of the MCS Geographical Identifiers (University of London et al., 2017) and 2011 Census aggregated data (Office for National Statistics, 2017) (author's analysis: weighted)

In the random intercept Poisson model (model 7), the relationship between ASB and two neighbourhood level variables, namely no-central heating ($IRR= 1.03, p<.01$) and bad health ($IRR= 1.10, p<.01$), is found to be significant. The result corresponds to the result of the random intercept multinomial logistic regression model (predicting severe ASB) (Table 8.4). However, the relationship between ASB and neighbourhood unemployment rate is found to only be significant in the random intercept multinomial logistic regression model (predicting severe ASB). This means that an increase in neighbourhood unemployment rates increases the risk of perpetrating severe ASB, but it does not increase the risk of ASB frequency at a statistically significant level.

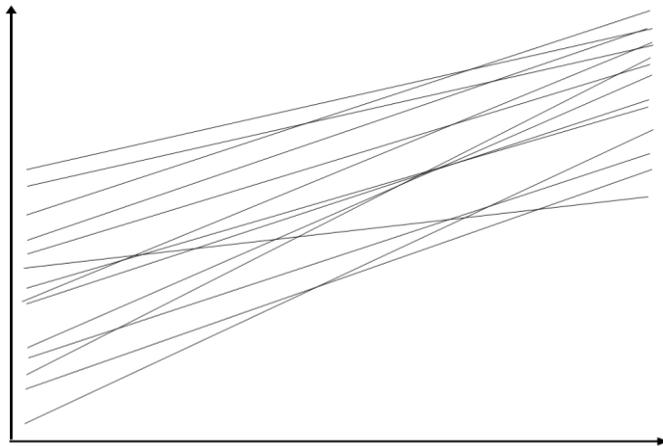
In summary, out of nine neighbourhood level variables, no-central heating and bad health were significantly associated with the between-neighbourhood variance of ASB across neighbourhood units both in the random intercept multinomial logistic (predicting severe ASB) and Poisson regression. Neighbourhood unemployment rates were significantly associated with ASB only in the random intercept multinomial logistic regression. Not all of the neighbourhood level variables showed a significant relationship with the dependent variable. However, some significant effects of neighbourhood conditions on ASB suggest that neighbourhood level factors should be considered together with individual and family level factors when understanding ASB.

8.3. Research Questions 3: Random effects multilevel model

In Model 7 (in Tables 8.4 and 8.5), this study allowed ASB to vary across neighbourhoods using random intercept multinomial logistic and Poisson regression models and also included individual, family and neighbourhood level predictors of ASB. However, the effects of these characteristics were assumed to be the same in each neighbourhood. Thus, for the discussions of Research Questions 2-1 and 2-2, it was assumed that the relationship between ASB and level-1 variables was the same for each neighbourhood.

However, since this study will now seek to find out whether and how the level-1 variables' effects on ASB vary according to the characteristics of neighbourhoods, the model for the effects of the level-1 predictors needs to be further developed. A random coefficient multilevel model will therefore be implemented by allowing both the intercept and the slope to vary randomly across neighbourhood units. Figure 8.2 illustrates random effects (random intercept + random slope/coefficient) in a multilevel model.

Figure 8.2 Illustration of random coefficient/slope in multilevel model



As mentioned in Chapter 5, since the term ‘slope’ is only appropriate for a linear relationship between two continuous variables, this study uses the more general term ‘coefficient’ and refers to a random slope model as a random coefficient model. In the random coefficient model, the coefficients of one or more explanatory variables can vary from one neighbour to another. The first step in building the random coefficient multilevel model is examining whether the level-1 predictors’ effects vary across neighbourhoods at a statistically significant level. This first step is connected to Research Question 3-1.

8.3.1. Question 3-1: Random coefficient model

Question 3-1: Are there neighbourhood level variations in the individual and family level factors’ effects on antisocial behaviour among young people?

The random effect multilevel model described in Chapter 5 is used to test research questions 3-1 and 3-2 (See Appendix 5.3 for further details on the underpinning statistical theory). An LR test can be used to test whether the effect of each individual and family level variable varies across neighbourhoods. The presence of random coefficients is assured by “finding non-zero, or statistically significant variances for level-1 effects, or $\text{Var}(\beta_{1j}) = \text{Var}(u_{1j}) = \gamma_{11} \neq 0$ ” (Kim, 2004, p.131). The null hypothesis for the LR test is that there is zero variance associated with the level-1 variable (e.g., low household income). For example, the significant LR test result ($-2\Delta LL(2)=306, p<.001$) comparing the random coefficient multinomial logistic regression model (allowing low household income to vary across different neighbourhoods) and the corresponding random intercept model means that: there is evidence that the effect of low household income on ASB differs across neighbourhoods. The significant result of the LR test

statistic thus means that this study can reject the null hypothesis and conclude that the effects of the level-1 predictors do in fact vary significantly across neighbourhoods.

Table 8.6 Variance of random effects in multinomial logistic and Poisson regression models

Random Slope	Multinomial logistic regression				Poisson regression			
	variance (γ_{11})	SE (γ_{11})	LR test	^a	variance (γ_{11})	SE (γ_{11})	LR test	^a
<i>Socio demographic factors</i>								
Male	-0.18	0.21	92	***	0.10	0.13	92	**
Ethnic minority status	-0.59	3.23	72	***	0.10	0.08	3	
Low household income	4.99	1.66	306	***	0.06	0.01	49	***
Social housing	0.50	0.15	21		0.00	0.00	0	
Single-parent household	0.15	0.43	25		0.31	0.03	54	***
<i>Behavioural factors</i>								
Illegal drugs	1.13	0.21	294	***	0.04	0.02	28	***
Victim of ASB	-0.5	0.54	26		0.04	0.03	2	
High risk taking	-1.44	0.45	170		0.22	0.13	4	
Low bond with school	2.71	0.66	6		0.3	0.07	36	***
Drug taking friends	3.17	1.18	60		0.10	0.03	33	***
Friends with school trouble	-0.65	0.26	3		0.06	0.02	19	***
Low parental supervision	-158.30	-	4		0.27	0.07	37	***

Note: a-Likelihood ratio test (random intercept model (Model 7) as a reference), Each random slope component of the ASB model was included in the model variable-by-variable, All the level-1 & level-2 predictors are included in the model, **p<.01 ***p<.001, N of observations (groups): 6019 (3678)
Source: Sixth survey of the MCS (University of London et al., 2019), Sixth survey of the MCS Geographical Identifiers (University of London et al., 2017) and 2011 Census aggregated data (Office for National Statistics, 2017) (author's analysis: weighted)

The variance of the random coefficient/slope in the multinomial logistic and Poisson regression models and the detailed LR test results are presented in Table 8.6. All of the random slope components of the ASB model can be examined simultaneously but this can lead to serious estimation issues. Thus, it is advised that “examining random slope variation is best done on a variable-by-variable basis since it often leads to estimation problems including a convergence problem or an extremely slow computation” (Hox, 2010, p.58). Thus, each random slope component of the ASB model was included in the model variable-by-variable.

In summary, these findings suggest that the effects of four of the level-1 predictors, namely male, ethnic minority status, low household income and illegal drug use vary significantly across the neighbourhood units in the random coefficient multinomial logistic model while most of the level-1 predictors vary significantly across the neighbourhood units in the random coefficient Poisson regression model except for ethnic minority status, social housing, victim of ASB and high risk taking. This means that the majority of the relationships between ASB and the level-1 variables in the random coefficient Poisson models vary across neighbourhoods and some of them vary across neighbourhoods in the random coefficient

multinomial logistic model. For example, in both the random intercept multinomial logistic and Poisson regression model being male raises the risk of perpetrating ASB (model 7 in section 8.2) but this relationship is not the same in all neighbourhoods when the slope is allowed to vary randomly across neighbourhoods. This means that in some neighbourhoods with a low coefficient for the gender slope, the gaps between males and females are relatively small. In other neighbourhoods with a large coefficient for the gender slope, gender has greater effects on ASB. The variance in the slope for low household income can be understood in a similar way. In neighbourhoods with a high coefficient for the low household income slope, low household income has large effects on their ASB, and vice versa. The findings from this section demonstrate that the effects of some level-1 factors on ASB among young people indeed vary significantly across neighbourhoods. This enables this study to further test the cross-level interaction between neighbourhood level (level-2) and individual and family level (level-1) variables. This relationship is developed by Research Question 3-2.

8.3.2. Question 3-2: Cross-level interactions

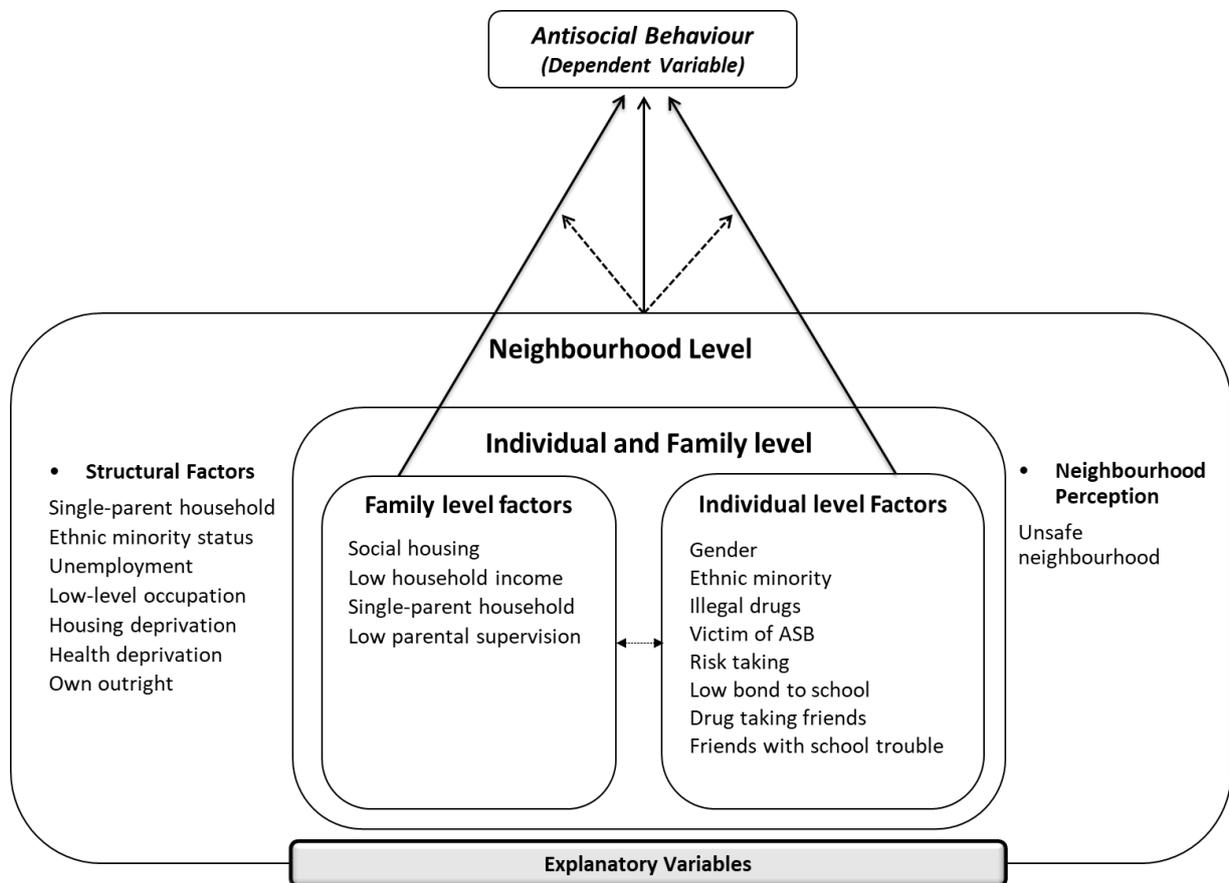
Question 3-2: what are the neighbourhood level characteristics that significantly explain the variation in the effects of individual and family level characteristics on antisocial behaviour across different neighbourhoods?

It was found in the previous section that some level-1 variables' effects on ASB vary across neighbourhoods. However, which neighbourhood characteristics are linked with the variation in the association between the level-1 predictors and ASB is not yet specified. The cross-level interaction effect tests between the level-2 and level-1 independent variables are used to answer research question 3-2. As it involves explanatory variables from different levels, it is referred to as a cross-level interaction (Hox, 2010).⁷² The cross-level interactions in antisocial

⁷² In order to properly interpret the cross-level interaction, the interaction $\gamma_{11}Z_jX_{ij}$ in Equation [5.13] needs to be interpreted together with $\gamma_{01}Z_j$, which is the overall regression coefficient between the dependent variable and the level 2 predictor. Let's assume that there is one individual level independent variable, gender, and one neighbourhood level explanatory variable, bad health, in the model, which also has a cross-level interaction between the level-1 and level-2 variables. If γ_{01} in Equation [5.13] is positive, the average ASB is higher in a neighbourhood with a higher rate of residents with bad health. Conversely, if γ_{01} is negative, the average ASB is lower in neighbourhoods with a lower rate of residents with bad health. The relationship between ASB and gender of the young people depends on the rate of residents with bad health in their neighbourhoods (Z). If γ_{11} is positive, the gender effect on ASB is larger when young people live in a neighbourhood with a high rate of residents with bad health. Conversely, if γ_{11} is negative, the gender effect on ASB is smaller when they live in a neighbourhood with a high rate of residents with bad health. Thus, the neighbourhood level bad health variable acts as a moderating factor for the association between ASB and gender; this association varies depending on the value of the moderator factor.

behaviour model are illustrated in Figure 8.3. The arrows (with dotted line) from neighbourhood factors to the arrows of individual and family level factors present the cross-level interaction.

Figure 8.3 Cross-level interaction effects in antisocial behaviour model



The significance of the regression coefficients of the cross-level interaction terms in the multilevel models are used to answer research question 3-2. For those level-1 variables that have significant random slope variance (Table 8.6) and that also show significant coefficient in random intercept model (model 7 in Table 8.4 and Table 8.5), three of the level-1 variables in the multinomial logistic regression model and seven variables in the Poisson model, the neighbourhood models of the slope are further developed utilising the neighbourhood level independent variables that show a significant relationship with the dependent variable (model 7). Examinations of the cross-level interaction effects are again conducted on a variable-by-variable basis. In addition, as advised by Hox (2010), both of the direct effects in the interaction terms are added to the model and controlled for. Table 8.7 and Table 8.8 shows the result of the cross-level interaction tests.

Tables 8.7 and 8.8 show the test results for the cross-level interactions. Table 8.7 show that there are three significant cross-level interactions in the random coefficient multinomial logistic

regression analyses : between drug taking friends and three neighbourhood level variables: bad health (minor ASB: $B=1.28$, $p<.05$), no-central heating (minor ASB: $B=-1.35$, severe ASB: $B= 2.29$, $p<.05$), and neighbourhood unemployment (minor ASB: $B= 1.35$, severe ASB: $B=2.26$, $p<.05$). In the random coefficient Poisson regression in Table 8.8, one significant cross-level interaction is found between gender and neighbourhood bad health ($B=-.11$, $p<.05$).

Table 8.7 Cross-level interactions in antisocial behaviour multinomial logit model

Random Slope	<i>Never versus Minor</i>				<i>Never versus Severe</i>			
	<i>B</i>	<i>(95% CI)</i>	<i>SE(B)</i>	<i>RRR</i>	<i>B</i>	<i>(95% CI)</i>	<i>SE(B)</i>	<i>RRR</i>
Bad health								
X Male	-0.07	(-0.65-0.51)	0.29	0.93	-0.18	(-0.59-0.22)	0.21	0.59
X Ethnic minority status	0.04	(-3.13-3.21)	1.62	1.04	-0.90	(-3.82-2.01)	1.48	0.41
X Drug taking friends	1.28	(0.08-2.48) *	0.61	3.61	2.31	(0.51-4.10)	0.91	10.10
No-central heating								
X Male	0.04	(-0.57-0.66)	0.31	1.04	-0.90	(-0.07-0.27)	0.59	0.40
X Ethnic minority status	-0.94	(-2.82-0.92)	0.95	0.38	-1.16	(-6.41-4.09)	2.68	0.31
X Drug taking friends	1.35	(0.16-2.56) *	0.61	3.88	2.29	(0.51-4.06) *	0.91	9.88
Un-employment								
X Male	0.60	(-0.12-1.34)	0.37	1.38	0.66	(-0.61-0.21)	0.21	1.94
X Ethnic minority status	0.75	(-0.24-1.75)	0.51	2.10	-0.49	(-2.18-1.18)	0.58	0.65
X Drug taking friends	1.35	(0.11-2.50) *	0.60	3.68	2.26	(0.44-4.08) *	0.92	9.67

Note: Each cross-level interaction of the ASB model was included in the model variable-by-variable, All the level-1 & level-2 predictors are included in the model, B=coefficient, 95% CI, RRR= Relative Risk Ratio, * $p<.05$, N of observations (groups): 6019 (3678)

Source: Sixth survey of the MCS (University of London et al., 2019), Sixth survey of the MCS Geographical Identifiers (University of London et al., 2017) and 2011 Census aggregated data (Office for National Statistics, 2017) (author's analysis: weighted)

Table 8.8 Cross-level interactions in antisocial behaviour Poisson model

Random Slope	<i>B</i>	<i>(95% CI)</i>	<i>SE(B)</i>	<i>IRR</i>
No-central heating				
X Male	-0.03	(-0.07-0.01)	0.02	-0.97
X Single parent household	-0.00	(-0.01-0.02)	-0.02	1.01
X Illegal drugs	-0.01	(-0.03-0.02)	-0.01	-0.99
X Drug taking friends	-0.00	(-0.01-0.02)	-0.02	1.00
X Friends with school trouble	0.01	(-0.02-0.04)	0.02	1.01
X Low bonds to school	-0.03	(-0.06-0.02)	0.02	0.99
X Low parental supervision	0.01	(-0.05-0.02)	0.03	1.00
Bad health				
X Male	-0.11	(-2.21-0.01) *	0.06	0.89
X Single parent household	-0.01	(-0.03-0.01)	0.01	0.99
X Illegal drugs	0.03	(-0.09-0.09)	0.03	1.03
X Drug taking friends	-0.00	(-0.04-0.03)	0.05	1.00
X Friends with school trouble	0.01	(-0.07-0.08)	0.04	1.01
X Low bonds to school	-0.04	(-0.07-0.01)	0.06	0.94
X Low parental supervision	0.02	(-0.04-0.06)	0.08	1.02

Note: Each cross-level interaction of the ASB model was included in the model variable-by-variable, All the level-1 & level-2 predictors are included in the model, * $p<.05$, N of observations (groups): 6019 (3678)

Source: Sixth survey of the MCS (University of London et al., 2019), Sixth survey of the MCS Geographical Identifiers (University of London et al., 2017) and 2011 Census aggregated data (Office for National Statistics, 2017) (author's analysis: weighted)

A more detailed interpretation of the significant cross-level interactions found from the multinomial logistic regression model follows. The positive coefficient for drug taking friends by neighbourhood bad health rates (minor ASB: $B=1.28$, $p<.05$), by neighbourhood no-central heating rates (minor ASB: $B=-1.35$, severe ASB: $B= 2.29$, $p<.05$), and by neighbourhood unemployment rates (minor ASB: $B= 1.35$, severe ASB: $B=2.26$, $p<.05$) combined with the positive coefficient for the main effect of drug taking friends (minor ASB: $B= 0.78$, severe ASB: $B= 1.11$, $p<.001$) suggests that young people who have more friends who take illegal drugs are more likely to perpetrate ASB, and the effect of having drug taking friends increases when respondents live in a neighbourhood that has high rates of bad health population, accommodation with no-central heating, or unemployment.⁷³

In the random coefficient Poisson regression model, one significant cross-level interaction, between gender (level-1) and health deprivation (level-2), was found that was not significant in the random coefficient multinomial logistic regression model. The negative coefficient for being male by neighbourhood bad health ($B=-.11$, $p<.05$) combined with the positive coefficient for the main effect of being male ($B=.46$, $p<.001$) suggests that boys are more likely to commit ASB compared to girls, but that the effect of gender on ASB reduces when respondents live in a neighbourhood with high levels of health deprivation (reported bad health).⁷⁴ The following three cross-level interactions that were significant in the random coefficient multinomial logistic model were not significant in the random coefficient Poisson model: between drug taking friends and three neighbourhood level variables - bad health, no-central heating and unemployment.

⁷³ The slope of minor antisocial behaviour on drug taking friends is expected to equal $\gamma_{10} = -.03$ for groups living in a neighbourhood with an average rate of no central heating or with an average rate of unemployed population, however, the relationship between drug taking friends and minor antisocial behaviour becomes stronger, by $\gamma_{11} = 1.35$ units, as the rate of unemployed population or households with no central heating increases by one unit. Similarly, The slope of severe antisocial behaviour on drug taking friends is expected to equal $\gamma_{10} = -.06$ for groups living in a neighbourhood with an average rate of no central heating or with an average rate of unemployed population, however, the relationship becomes stronger, by $\gamma_{11} = 2.26$ units, as the rate of unemployed population increases by one unit, and by $\gamma_{11} = 2.29$ units, as the rate of households with no central heating increases by one unit. The slope of minor antisocial behaviour on drug taking friends is expected to equal $\gamma_{10} = .31$ for groups living in a neighbourhood with an average rate of bad health, however, the relationship between drug taking friends and minor antisocial behaviour becomes stronger, by $\gamma_{11} = 1.28$ units, as the rate of residential bad health increases by one unit.

⁷⁴ The slope of antisocial behaviour on gender is expected to equal $\gamma_{10} = .45$ for groups living in a neighbourhood with an average rate of population with bad health however, the relationship between gender and antisocial behaviour becomes weaker, by $\gamma_{11} = -.11$ units, as the rate of the population with bad health increases by one unit.

8.4. Conclusion

This chapter investigated the effects of individual, family and neighbourhood level characteristics on ASB among young people. The preliminary test result for the variance component models both in the multinomial logistic and Poisson regression models suggests that the prevalence of ASB varies across the neighbourhoods. It allows this study to introduce a multilevel modelling. The random intercept regression analysis (Research Question 2-1) results also demonstrate that the prevalence of ASB varies across different neighbourhoods even when level-1 variables are held constant in the model.

Considering the neighbourhood level variance of ASB, several neighbourhood level variables are incorporated into the model (Research Question 2-2). Of the neighbourhood level structural and perception variables, housing and health deprivation predicted the neighbourhood level prevalence of ASB at a statistically significant level in both the random intercept multinomial logistic and Poisson regression models. However, high local unemployment was significantly associated with ASB only in the random intercept multinomial logistic model. These findings correspond to the findings from previous research on neighbourhood effects on youth ASB. These studies suggested that neighbourhood level deprivation or disadvantage has significant effects on antisocial or delinquent behaviour among young people although the effect was relatively weak in comparison to the effect of individual and family level factors (Bruce, 2004; Leventhal and Brooks-Gunn, 2000; Shaw and Mackay, 1942; Sampson et al., 1997; Sampson and Groves, 1989; Beyers et al., 2001; Loeber et al., 1998; Herrenkohl et al., 2000).

The findings from the random intercept models are especially meaningful since this study included a variety of neighbourhood level characteristics that are considered to be relevant in predicting ASB in the model separately, rather than adopting a compound deprivation variable. Thus, this study was able to measure the effects of specific neighbourhood characteristics (e.g., health deprivation or housing deprivation) on ASB rather than simply estimating the relationship between overall deprivation and ASB. This allows this study to develop more specific policy and practice suggestions. Using a compound neighbourhood deprivation or disadvantage score enables to rank neighbourhoods against each other for statistical comparisons. However, it cannot identify area level conditions regarded as most relevant to neighbourhood effects on individual outcomes (McCulloch and Joshi, 2000). With the overall deprivation measure, it can only be argued that in reducing ASB, efforts should be made to reduce material inequalities between neighbourhoods. However, this study could further suggest that efforts in reducing area-level inequalities should involve improvements in the health, housing and employment conditions of more deprived areas.

The results for Research Question 3-1 show that the relationship between ASB and many of the level-1 variables in the random coefficient models are not same across the neighbourhoods. Considering the significant random effects of the slopes, the cross-level interaction tests are conducted. The cross-level interaction test result (Research Question 3-2) shows that the effect of drug taking friends on ASB significantly interacts with neighbourhood deprivation (housing, bad health and unemployment) in multinomial logistic while the effect of ethnic minority status significantly interacts with neighbourhood housing deprivation only in the random coefficient Poisson regression model.

The findings of some significant random slope variance and cross-level interactions allow this study to understand the relationship between individual, family, and neighbourhood level effects on ASB in a more meaningful way. The findings from the random intercept models already showed the significant relationship between certain neighbourhood characteristics and ASB. However, answering Research Question 3 helps to further understand whether and how neighbourhood level conditions (e.g., neighbourhood health deprivation) reshape the relationship between the level-1 predictors (e.g., drug taking friends) and ASB.

Thus, the findings from the random coefficient model provide some important new evidence that allows this study to come up with meaningful youth policy and practice implications. Not many neighbourhood studies on ASB have measured the random slope/coefficient variation and cross-level interactions. They have often looked for neighbourhood level variation in explaining ASB but have not attempted to further investigate the cross-level interactions between neighbourhood level and level-1 independent variables (see for example, Winslow and Shaw, 2007; Ingoldsby et al., 2006; Browning et al., 2008).

The results of the random intercept models suggest that to effectively reduce ASB among young people, reducing material inequalities between different neighbourhoods (including tackling inequalities in health, housing and unemployment) is required. The findings of the random coefficient models further suggest that different approaches and youth programmes considering unique neighbourhood conditions are needed to tackle ASB among young people. For example, boys are more likely to perpetrate ASB compared to girls in general but the effects of gender on ASB reduce when they live in a neighbourhood with a higher level of health deprivation (Poisson model). This means that intervention programmes that focus more on boys may work more effectively in neighbourhoods with high health deprivation but programmes that overlook female perpetrators may not work in areas with high health deprivation. Based on the findings from this chapter and the previous analysis chapters more detailed policy implications and recommendations for further research are made in the next chapter.

Chapter 9. Discussion

The primary contribution of this thesis is the provision of an estimate of the individual, family, and neighbourhood level effects on antisocial behaviour among young people in England and Wales, using advanced statistical models and measurement. The findings of this study suggest that, in order to fully understand antisocial behaviour among young people, as well as individual and family level characteristics, area level conditions should also be considered. One of the important questions this study asked was whether it matters where children grow up. More specifically, this study questioned whether the neighbourhood young people live in has significant effects on antisocial behaviour among young people. The answer, given the evidence from the previous studies and from current study, is yes, it does matter, and it does have significant effects on antisocial behaviour among young people. While the result of this study, like those of most other neighbourhood studies, stress the importance of socio-demographic and behavioural factors (e.g., gender and use of illegal drugs), the conditions of neighbourhoods (e.g., high unemployment rate and housing deprivation) also contribute to antisocial behaviour among young people.

In this final chapter, the key findings from the analysis chapters are considered and the original contribution of this study is highlighted. The limitations of this research are expanded on, and this is followed by a discussion of recommendations for future research and the implications for policy.

9.1. Summary of the findings

This section summarises the most pertinent findings, firstly relating to the effects of individual and family level characteristics on antisocial behaviour and secondly to the effects of neighbourhood level conditions on antisocial behaviour.

This thesis demonstrated that the relationships between antisocial behaviour and a number of individual and family level factors (identified from the literature review as the determinants of antisocial behaviour) were statistically significant when tested with the sixth sweep of the Millennium Cohort Study (MCS). The results from both the multivariate multinomial logistic and multivariable Poisson regression analyses (Chapter 7) demonstrated that antisocial behaviour was more prevalent among young people who were male, were from an ethnic minority group, took illegal drugs, had been the victim of antisocial behaviour, had a low bond with school, were friends with young people who took drugs or making trouble at school, or/and experienced low parental supervision. Antisocial behaviour was also prevalent among young people from households with a low income level, who lived in social housing or/and who

showed high risk taking behaviours but these relationships were found to be statistically significant in either the multivariate multinomial logistic or the multivariate Poisson regression analyses, not in both. This shows that depending on how the antisocial behaviour variable is measured, the relationship between antisocial behaviour and the predictors also varies and the interpretation should be made differently. For example, social housing raised the risk of perpetrating minor and severe forms of antisocial behaviour (multinomial logistic regression) but did not increase the risk of perpetrating more types of antisocial behaviour (Poisson regression) at a statistically significant level. This result suggests that youth services/policy to improve housing deprivation may have an important role in reducing specific forms of antisocial behaviour (e.g., severe or minor ASB).

Another important finding of this study was that the likelihood of antisocial behaviour among young people varied significantly across different neighbourhoods. In other words, where young people and children lived mattered and, more specifically, the likelihood of committing antisocial behaviour was influenced by where they lived. In Chapter 8, random intercept multilevel analyses were used to identify the relationship between neighbourhood level characteristics and antisocial behaviour. Both the random intercept multinomial logistic regression and Poisson regression models demonstrated that the likelihood of antisocial behaviour was more prevalent among young people who lived in areas with high levels of housing and health deprivation. The likelihood of antisocial behaviour was also more prevalent among young people who lived in areas with high rates of unemployment but only in the random intercept multinomial logistic regression predicting severe antisocial behaviour. This suggests that when young people live in a neighbourhood with a high rate of unemployment, the likelihood of engaging in severe forms of antisocial behaviour increases (multilevel multinomial logistic regression); however, it does not raise the risk of perpetrating more types of antisocial behaviour (multilevel Poisson regression) or minor forms of antisocial behaviour (multilevel multinomial logistic regression).

When cross-level interactions between level-1 (individual + family level) and neighbourhood level factors were tested in random coefficient multilevel models (see section 8.3.1), many of the individual/family level variables' effects on antisocial behaviour were not constant across neighbourhood units. This means that the individual and family level characteristics' effects on antisocial behaviour among young people were altered by the characteristics of the neighbourhood in which they lived. In other words, depending on where they lived, the individual and family level factors' effects on antisocial behaviour among young people also varied. For instance, boys were more likely to commit antisocial behaviour in general, but the gender gap between males and females was smaller for young people who lived in a

neighbourhood with a high level of health deprivation (random coefficient Poisson regression). Also, young people were more likely to engage in antisocial behaviour when they had more friends who took illegal drugs, and the effect of having drug taking friends increased when young people lived in a neighbourhood that had high rates of bad health population, accommodation with no-central heating, or unemployment (random coefficient multinomial logistic regression).

To sum up, the findings of this study suggest that individual and family level factors have statistically stronger effects on the prevalence of antisocial behaviour among young people compared to the effects of neighbourhood level characteristics. However, the results from a number of multilevel analyses demonstrate that the conditions of the neighbourhood in which young people live also plays an important role in explaining antisocial behaviour. Thus, this study concludes that considering one or two risk factors or a single level of factors provides only a partial view in understanding antisocial behaviour. As a number of the statistical test results, including the cross-level interaction result, suggested, individual, family and neighbourhood level factors are interconnected in influencing antisocial behaviour. Thus, they need to be considered together in explaining and understanding antisocial behaviour.

9.2. Contributions to the knowledge

9.2.1. Youth justice knowledge

This study contributes to the youth justice knowledge by adding evidence regarding the relationship between antisocial behaviour and different levels of factors. The findings of this study demonstrate that each level of factors (i.e., individual, family and neighbourhood) has unique effects on antisocial behaviour but at the same time they are interconnected with each other. The individual and family level analysis results (see Chapter 7) showed some interesting findings, for example, the significant relationship between victims of antisocial behaviour and antisocial behaviour. The result indicated that as young people who have been a victim of antisocial behaviour are more likely to engage in antisocial behaviour, a strict separation between victims and perpetrators is difficult. This highlights the need to depart from the risk-based approach that distinguishes between victims and perpetrators and responsabilises individuals (discussed more in section 9.4).

In addition, the testing of the interaction effects between individual and family level factors (e.g., gender and school trouble friend) provided an extended view in understanding antisocial behaviour (see Chapter 7). For example, the significant effect of having friends who cause trouble at school on antisocial behaviour suggests that when young people have more friends

who cause trouble at school, they are more likely to engage in antisocial behaviour compared to young people who do not have friends who cause trouble at school. However, the significant interaction between friends who cause trouble at school and gender showed that the effect of friends who cause trouble at school is greater for girls compared to boys. More specifically, in perpetrating antisocial behaviour, girls are more likely to be influenced by their friends who make trouble in school compared to boys. This information is especially useful when developing youth programmes/policy; it suggests that in reducing antisocial behaviour, a different approach for different genders may work more effectively.

Some findings from the neighbourhood level analyses (Chapter 8) also add useful evidence to the youth justice knowledge. The significant neighbourhood level factors' effects on antisocial behaviour among young people suggest that the effort in reducing area level inequalities should involve improvements in the health, housing and employment conditions of more deprived areas. Since this study is one of the few studies to have examined neighbourhood level effects on antisocial behaviour among young people with a relatively recent dataset that is representative of England and Wales, the findings of this study could be used as useful evidence that suggests the need for an area level approach above an individual level risk-based approach in tackling antisocial behaviour (discussed more in section 9.4).

Moreover, the findings from the random coefficient model (Chapter 8) provide some important evidence that allows this study to provide meaningful youth policy and practice implications. Few neighbourhood studies on antisocial behaviour have examined the random slope/coefficient variation and cross-level interactions. Neighbourhood studies have often measured the neighbourhood level variation in explaining antisocial behaviour but have not further tested the moderation effects between neighbourhood level and individual level factors (see for example, Winslow and Shaw, 2007; Ingoldsby et al., 2006; Browning et al., 2008). Thus, the findings of this study add to the existing youth knowledge by providing evidence on the significant interaction effects between the different levels of factors in predicting antisocial behaviour. The significant cross level interaction effects demonstrate that different youth policy/programmes that consider the unique neighbourhood conditions are required to tackle antisocial behaviour among young people. For example, boys are more likely to perpetrate antisocial behaviour compared to girls in general but the effects of gender on antisocial behaviour reduce when they live in a neighbourhood with a high level of health deprivation. This finding demonstrates that youth intervention programmes that focus more on boys may work effectively in neighbourhoods with low levels of health deprivation but programmes that overlook female perpetrators may not work in areas with high levels of health deprivation.

Another cross-level interaction effect result also shows that young people who have more drug taking friends are more likely to engage in antisocial behaviour in general, and the effect of drug taking friends increases when they live in a neighbourhood with a high rate of unemployment, a high rate of population with bad health, or a high rate of housing deprivation. The mechanisms underlying the relationship between drug taking friends, neighbourhood level disadvantage and antisocial behaviour have not been addressed by this study. However, the collective efficacy model (Sampson, 2006a, b) (see section 4.2.3) provides a useful view in understanding this relationship. According to the collective efficacy model, concentrated neighbourhood structural disadvantages, such as low economic status, a high rate of residential mobility and a high rate of ethnic heterogeneity, operate as structural barriers that hinder the development of formal and informal bonds to promote a willingness to take part in pursuing the common good of the community. Thus, one possible explanation for the cross-level interaction between drug taking friends and the three neighbourhood level disadvantages could be that in a deprived area with a high rate of unemployment population, a high rate of population with bad health, or a high rate of housing deprivation, residents do not have high formal and informal bonds, which would encourage them to take part in supervising young people and stopping them from engaging in antisocial behaviour. The absence of social control in those neighbourhoods thus makes friends' effects even stronger in encouraging them from engaging in antisocial behaviour. This hypothesised explanation could be empirically tested in a future study that could use data that provide information on neighbourhood collective efficacy such as social control among residents.

9.2.2. Measurement of antisocial behaviour

To adequately address the relationship between a variety of individual and family level factors and antisocial behaviour, the construction of a validated antisocial behaviour measurement is essential. However, there has been a lack of research to date on how antisocial behaviour could be defined and measured. Although many previous studies have emphasised the importance of and the need for an appropriate measure of antisocial behaviour, few efforts have been made in terms of publishing work on how antisocial behaviour could be defined and measured (Home Office, 2004; Esposito et al., 2020). The information on antisocial behaviour that practitioners and policy makers receive should be derived from valid measures of antisocial behaviour. This is essential for developing policy and practices on antisocial behaviour that actually work. When the validity and reliability of an antisocial behaviour index is not guaranteed, we cannot be sure whether or not the index is measuring antisocial behaviour. If policy makers use information on antisocial behaviour that is based on an

unvalidated index, it will be difficult to guarantee the efficiency of the developed policy and practice.

A well validated antisocial behaviour index can ensure that the index used is measuring what it is supposed to measure. In previous studies, however, antisocial behaviour indices have often been created by simply aggregating a list of items that are considered to be associated with antisocial behaviour without being properly tested for reliability or validity (see Estévez and Emler, 2011; Barnes et al., 2002). Thus, in order to adequately address the relationship between a variety of individual and family level factors and antisocial behaviour, this study conducted a series of reliability and validity tests. After the reliability and construct validity tests had been done, certain items that violated more than two types of the tests were deleted from the antisocial behaviour index as these items were not a 'good' measure of antisocial behaviour (see section 6.1). The development of a valid measurement is the first essential step in measuring the relationship between antisocial behaviour and different levels of independent variables. Previous studies on antisocial behaviour have often used reliability tests such as Cronbach's alpha test. However, a relative risk test and item response theory test have not yet been used together, at least in the UK, in developing an antisocial behaviour index. Thus, this study contributes to the existing knowledge by developing and using a reliable and scientifically valid measure of antisocial behaviour with recent data in examining the relationship between individual, family and neighbourhood level factors and antisocial behaviour.

After the development of the validated antisocial behaviour measurement, the index was used to create both count and categorical dependent variables. Although using a single type of antisocial behaviour has limitations of its own, the majority of the previous studies have tended to use either count (or continuous) or binary antisocial behaviour variables (Jacobs et al., 2020). Using a count or continuous antisocial behaviour variable prevents information loss that could reduce statistical power and allows linear or Poisson regression analysis to be conducted. However, when the count antisocial behaviour data is used as a dependent variable, the analysis result does not provide sufficiently detailed information to inform new policies or interventions. For example, we could learn that antisocial behaviour counts increased by 50% with a unit increase in males, e.g., going from 0 (female) to 1 (male) from the multivariate Poisson regression analysis (section 7.2.2). This type of information is useful in showing the general relationship between gender and antisocial behaviour, that boys are more likely to commit more types of antisocial behaviour compared to girls. However, it does not provide information on what specific type of antisocial behaviour is associated with gender, which would be more useful in informing policy makers and practitioners.

Thus, in this study, a categorical antisocial behaviour variable was also used as a dependent variable and a series of multinomial logistic regression analyses were conducted. Using categorical data enabled this study to make a distinction between severe and minor antisocial behaviour perpetrators and non-perpetrators. The distinction between severe, minor and non-perpetrators of antisocial behaviour allowed this study to develop more specific policy suggestions. For example, the findings of this study indicate that, to reduce severe forms of antisocial behaviour such as using weapons or gang activities, an intervention programme should focus on reducing the use of illegal drugs and consider the influences of friends on the young people, as these factors have a significant impact on the likelihood of involvement in severe forms of antisocial behaviour.

Indeed, the importance of making a distinction between different types of antisocial behaviour subgroups has been highlighted by previous studies (Sawkins, 2002; Burt and Donnellan, 2009; White et al., 2001). Some previous studies on antisocial behaviour also used binary or categorical antisocial behaviour data as the dependent variable. However, they often made a distinction between perpetrators and non-perpetrators (e.g., Armstrong et al., 2005), between perpetrators who engage in more types of antisocial behaviour (e.g., 2+) and the rest (e.g., <2) (e.g., Flood-page et al., 2000) or between perpetrators with high antisocial behaviour frequencies and the rest (e.g., non-perpetrators + perpetrators with low antisocial behaviour frequencies) (e.g., Bor et al., 2004). The distinctions made by previous studies are useful in understanding certain aspects of antisocial behaviour. However, they are not sufficient if we are interested in separating young people who engage in severe forms of antisocial behaviour from those involved in minor forms of antisocial behaviour and non-perpetrators.

There is one study that made a distinction between young people with serious/violent offending experience and the rest (see McAra and McVie, 2010) but the data they used covered only Edinburgh. Therefore, this study is one of the most recent studies on antisocial behaviour in the UK to make a clear distinction between antisocial behaviour sub-groups using data that is representative of young people in England and Wales. In addition, this study is the only study in the UK that measures individual, family and neighbourhood level effects on antisocial behaviour using both count and categorical antisocial behaviour data that are validly measured. Thus, this study has moved our understanding of antisocial behaviour in the UK forward by developing a reliable and scientifically valid measure of antisocial behaviour with recent data and providing concurrent analysis of both count and categorical antisocial behaviour data.

9.2.3. Data and methodology

By using the Millennium Cohort Study (MCS), the analysis drew on data from “a large, nationally representative sample, which is geographically clustered and provides abundant information” (Heilman, 2013, p.271), including some measures of antisocial behaviour and variables that possibly influence these behavioural factors. One of the strengths of using the MCS is the availability of a variety of detailed individual characteristics and family background information, which are essential in building a strong antisocial behaviour model that can demonstrate that significant neighbourhood level effects are not simply due to neighbourhood compositions (Heilman, 2013).

Another major strength of this study is its application of the statistical methods that enabled this study to conduct the simultaneous modelling of between neighbourhood variability in the antisocial behaviour model. From a methodological perspective, this study used multilevel modelling in measuring area level effects on young people’s behaviours. Many other studies have found a relationship between neighbourhood conditions and the behaviour of young people, while controlling for individual and family level predictors. However, many neighbourhood research on young people’s behaviours have had limitations due to the lack of appropriate data combining skills at the individual and neighbourhood levels in the statistical model (Kalff et al., 2001). Therefore, many studies on neighbourhood effects on young people’s behaviours have failed to account for the nested structure of the data (Raudenbush and Bryk, 2002). Young people from the same area are more alike than young people from different neighbourhoods, suggesting that the variation of young people’s antisocial behaviour is lower than if it were completely random. A traditional regression models are not able to take into account the variance components of two or more different levels, which increase the risk of falsely identifying that there are significant neighbourhood level effects on antisocial behaviour (Kalff et al., 2001).

Thus, by using multilevel techniques in measuring neighbourhood effects on antisocial behaviour among young people, this study contributes to the existing literature on antisocial behaviour in the neighbourhood context. In fact, there are few existing studies on the relationship between neighbourhood and antisocial behaviour that have utilised multilevel modelling in the UK. Furthermore, to the best of the author’s knowledge, the estimation of neighbourhood level effects on antisocial behaviour using a variety of neighbourhood level characteristics from census data and combining that with the MCS data has not yet been carried out. Thus, this study is the first study to measure neighbourhood effects on antisocial behaviour with a multilevel methodology using the recent MCS data, which could be generalised to the England and Wales population.

9.2.4. Defining and measuring neighbourhood

One of the major challenges in studying neighbourhood effects is defining neighbourhoods in a meaningful way (Heilmann, 2013). Neighbourhood is an ambiguous concept, which can be interpreted in a various way depending on the context and people: individuals from the same street could define neighbourhoods differently. Moreover, it is considered that different aspects of neighbourhoods operate at different geographical scales: formal resources, for example community centres, may operate at larger scales than social processes, including trusts among the residents (Lupton, 2001; Oliver et al., 2007; Heilmann, 2013).

To conduct robust research on neighbourhood effects, “quantitative studies need to be sufficiently sophisticated to measure the complexity of the neighbourhood phenomenon” (Lupton, 2003, p.12). If not, neighbourhood studies could face the risk of stating that there are no significant neighbourhood effects merely because they have not been able to examine them (Lupton, 2003; Lupton and Kneale, 2012). Often, neighbourhood studies in the UK have been conducted using available administrative data, which are often collected at electoral ward level, but they are considered to be too large an area to appropriately measure the neighbourhood effects on antisocial behaviour among young people. In this regard, one of the further strengths of the data and analysis used for this study is the definition of neighbourhoods at a small area level. The selected geographical boundary – Lower Layer Super Output Area (LSOA) for England and Wales - is “designed to comprise socially homogeneous areas and can reasonably be assumed to have a similar meaning on the ground in the four UK countries” (Heilman, 2013, p.272). Thus, LSOAs are viewed to be a useful approximation for the concept of a neighbourhood.

Moreover, in order to construct more comprehensive contextual dataset by including important characteristics of neighbourhoods, administrative data (2011 Census data) was attached to the survey data (the MCS). This was done by including geocoded data measured at the LSOA level alongside the individual level Millennium Cohort Study dataset. In addition to a neighbourhood perception variable (unsafe neighbourhood), which was available from the MCS, several variables that could capture structural neighbourhood conditions that were suggested from social disorganisation theory and the collective efficacy model as predictors of antisocial behaviour (e.g., unemployment and single-parent households) were incorporated in the MCS data. Furthermore, instead of building a deprivation index or adopting an existing deprivation index, a variety of neighbourhood level data were used separately in this study.

Studies on neighbourhood effects often use composite measures of neighbourhood deprivation that include a mixture of the measures that could capture different aspects of

neighbourhood disadvantages, such as mean or median household income and educational attainment of the parents (Jencks and Mayer, 1990). Most of the neighbourhood studies that have tried to address the relationship between young people's behavioural problems and neighbourhood conditions using the MCS have also adopted combined neighbourhood deprivation measures, for example the Index of Multiple Deprivation (Flouri et al., 2010; Flouri et al., 2013; Flouri et al., 2015; Flouri et al., 2020). However, this approach makes it difficult to identify which particular neighbourhood conditions have a significant effect on individuals and which do not. This is a crucial factor in determining, for instance, whether young people's antisocial behaviour rates reduce when they live in low SES neighbourhoods with high single parent household rates or only when they live in predominantly low SES neighbourhoods. Thus, by using a number of neighbourhood level characteristics separately rather than using composite measures of neighbourhood disadvantage, this study fills an existing gap in the literature on neighbourhood studies, which concerns young people and children. Moreover, this study extends the existing knowledge on antisocial behaviour by measuring a specific effect of different neighbourhood level conditions that has been ignored by previous studies, including studies that have used the MCS dataset.

9.3. Limitations and recommendations for the future research

Even though this study represents a clear advancement over many existing studies on antisocial behaviour among young people, a number of limitations can be identified. These limitations point to the need for further research to better understand antisocial behaviour among young people.

This study is widely influenced by Bronfenbrenner's (1979; 1981; 1994) social ecological theory and some neighbourhood process models including social disorganisation theory, social capital and the collective efficacy model. As discussed in Chapter 4, the social ecological theory allows the incorporation of different levels of effects on antisocial behaviour among young people in understanding antisocial behaviour. Meanwhile, neighbourhood process models help to understand how neighbourhoods influence young people's lives, especially antisocial behaviour among them. Social ecological theory provides a set of interconnected ecological systems to help understand human behaviours, including the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. This study, however, was not able to include the macrosystem and chronosystem in the analysis model since wider belief systems or socio-cultural features that influence the participants were not included in the MCS; furthermore, it is a difficult concept to measure quantitatively. Although this study is broadly influenced by social ecological theory, the structure and methodological

approach of this study did not allow for the direct application of this framework. Thus, when interpreting the results of this study, this framework can be used only as a broad guideline. This means that there is a need for further studies using a qualitative methodology that can explore the interrelated influences of different macro- and chrono-systems on antisocial behaviour in the UK society.

In addition, some of the neighbourhood perception indicators that were originally suggested from the collective efficacy model (Sampson et al., 2002) to be important measures of neighbourhood conditions were not fully included in the analysis model of this study since the relevant information was not gained from the participants in the MCS. Therefore, the results of this study can only be used partially to support previous studies on this subject. Future research could extend the understanding of the neighbourhood level effects on young people by using a dataset that provides a variety of neighbourhood perception factors.

Another limitation of this study is related to the age of the participants from the chosen sweep of the MCS. As described in Chapter 5, the MCS sampled the children when they were aged 9 months, and then at 3, 5, 7, 11, 14 and 16 years old. Since this study used the sixth sweep of the Millennium Cohort Study, when the respondents were 14 years old, the result of this study can only explain individual, family and neighbourhood effects on antisocial behaviour among young people at age 14.⁷⁵ The sixth sweep was the most recent data when it was chosen to be used by this study; however, the seventh sweep has since become available and could be used to replicate this study.

As the children of the MCS get older, they will be able to provide more of their own views for the study. This will provide a good opportunity to obtain valuable insights such as how the young people themselves view their neighbourhoods and furthermore, whether their reported behaviours are clustered within neighbourhoods (Heilmann, 2013). It can be also expected that the neighbourhood effects increase as children get older and thus research questions that have been formed by the current and previous research can be addressed utilising data from the most recent and forthcoming sweeps of the MCS.

An essential step forward for this research is to extend the analysis by adopting longitudinal data on antisocial behaviour. Longitudinal studies have the strength of generating higher standards of evidence of causation (Velasquez, 2012; Bradley, 2017), and thus could correctly specify the temporal association between individual, family and neighbourhood factors and antisocial behaviour among young people. Additionally, a longitudinal study design would

⁷⁵ The 6th sweep of the Millennium Cohort Study was the latest data among the available datasets when selected for this study. The 5th sweep is also available, but it does not provide some important variables for this study including dependent variable (antisocial behaviour).

allow an extended understanding of antisocial behaviour among young people who move to different neighbourhoods with different characteristics. Longitudinal data that measure the effects of changing neighbourhood conditions on antisocial behaviour among young people could also contribute to the existing knowledge. Modelling a longitudinal study could be achieved by including another level in the model so that the lower level becomes occasion or time of measurement. This modelling could handle time varying and time invariant independent variables (Velasquez, 2012).

There are some limitations of this study that stem from the difficulties of a neighbourhood study itself. The modifiable areal unit problem (MAUP) is one of the issues that neighbourhood studies face when using aggregated spatial data. MAUP is known as “the sensitivity of spatial analytic results to the way in which the areal units are defined” (Guo and Bhat, 2004, p.138). The presence of the MAUP increases doubts about the reliability of the results from an analysis of aggregated spatial data since these results are likely to vary with “the level of aggregation (the scale problem) and with the configuration of the zoning system (the zoning problem)” (Fotheringham and Wong, 1991, p.1025).⁷⁶ More specifically, the findings on the strength of the effects of neighbourhoods on young people depend on the operational definitions of neighbourhoods that have been employed. Thus, when a different type of neighbourhood boundary was to be adopted, it could not be guaranteed that the same indices of neighbourhood differences could be estimated, or that the same neighbourhood level effects on young people's antisocial behaviour would be measured. While the neighbourhood definition that is adopted within this study, LSOA, is seen as one of the study's strengths, it is still not free from MAUP. There are approaches that can be used to handle MAUP, such as conducting multiscale and multizonal system analyses or developing scale-independent or insensitive analytical techniques (Wong, 2009). However, these approaches were not adopted in this study due to practical difficulties. Thus, readers need to consider this issue when interpreting the findings on neighbourhood effects on young people. Future research using aggregated spatial data could adopt one of the approaches introduced to provide a better understanding via a spatial analysis of antisocial behaviour.

In addition, recent studies have measured neighbourhood effects via ‘activity spaces’ using ‘GPS technologies’ (Martin, 2019). These studies used the geographical spaces that young people engage in instead of administrative boundaries in measuring neighbourhood effects, which is considered to represent a more realistic description of neighbourhoods (Kwan, 2018; Martin, 2019). In addition, mobile survey methods adopted together with GPS (ecological

⁷⁶ See Fotheringham and Wong (1991), Guo and Bhat (2004) and Buzzelli (2020) for more information on the modifiable areal unit problem.

momentary assessment) can be adopted “to collect data to quantify the neighbourhood social environmental conditions from the perspective of young people” (Martin, 2019 p.203). Such research on young people has been carried out in urban city in the US (Byrnes et al., 2017) which could be duplicated in different contexts, including the UK.

Another major limitation that stems from neighbourhood study is the problem of selection bias. It is often argued that particular conditions of neighbourhoods attract or drive out individuals with certain characteristics, and therefore individuals are not randomly distributed (Velasquez, 2012). On the other hand, the decision about which area to live in is also affected by individual and family level characteristics, such as SES, income, education and occupation that could also affect behaviours of children and young people (Peeples and Loeber, 1994; Velasquez, 2012). The methodological approach adopted for this study was not able to isolate “observable neighbourhood effects from the effects of unobservable individual level factors that may be related to neighbourhood level conditions” (Velasquez, 2012, p.247). Such bias could lead to overestimating the effects of neighbourhoods, which are in fact associated with the individual or family level characteristics. However, in this study this issue was reduced to some extent by controlling for individual and family level factors’ effects that are deemed to be associated with the occurrence of antisocial behaviour among young people. In addition, to exclude the same source bias (Diez-Roux, 2007) the 'split sample' design, “whereby neighbourhood data is gained from a different sample than the individual survey” (Velasquez, 2012, p.247), was used.⁷⁷

9.4. Policy implications

As was addressed in Chapter 2, the main policies and practices in tackling antisocial behaviour developed by recent governments have largely been based on punitive risk-based approaches. Many of the early prevention schemes (e.g., Youth Inclusion Programmes and the Troubled Families programmes) were criticised for their punitive approach, which extended the criminal justice orbit and risked stigmatising environments by targeting and responsabilising young people and their families (see section 0). In addition, many of the area-based Initiatives considered the residents as victims and the young offenders as perpetrators rather than trying to improve the material conditions of deprived neighbourhoods and reduce the prevalent social inequalities.

⁷⁷ Same source bias is “the possibility that the use of self-reported data for both the outcome and the neighborhood characteristic generates a spurious association between the two because the measurement error in both reports is correlated or because the outcome affects the perception or report of the neighborhood attribute” (Diez-Roux, 2007, p.5).

However, the results of this study highlight the need to depart from the risk-based approach that distinguishes between victims and perpetrators and responsabilises individuals. The findings from the individual and family level analysis of antisocial behaviour (see Chapter 7) show that one of the most important factors that is associated with antisocial behaviour is being a victim of antisocial behaviour. This means that it is difficult to clearly distinguish between victims and perpetrators of antisocial behaviour. Some young people engage in antisocial behaviour but at the same time they could also be victims of antisocial behaviour who need support. This finding suggests that youth programmes are required that are more inclusive rather than making a clear distinction between victims and young offenders. Programmes that include a more general youth population and that are located outside of the youth justice system may help to tackle antisocial behaviour, without targeting and stigmatising specific young people.

One of the important findings of this study is the between-neighbourhood differences in the prevalence of antisocial behaviour (see section 8.2): when young people live in an area with a high unemployment rate or a high level of housing or health deprivation, the likelihood of perpetrating antisocial behaviour increases. This emphasises the importance of an approach that can reduce the area level material inequalities that young people who are often from the most disadvantaged areas face. More specifically, the effort in reducing area level inequalities should involve improvement in the health, housing and employment conditions of more deprived areas. Making positive changes for vulnerable young people and making improvements to the disadvantaged areas surrounding them cannot be done over a short period. Thus, in order to create youth programmes to bring a positive impact not only to vulnerable young people and their families but also to the conditions of the areas in which they live, long term support that is not easily affected by political circumstances such as austerity should be guaranteed for such programmes.

In addition, the result of the between-neighbourhood differences in severe forms of antisocial behaviour has implications for the approaches used to tackle knife crime and gang involvement, which have recently been considered to be serious issues in England and Wales. As shown by the implementation of Knife Crime Prevention Orders 2019, which allow 12-17 year old children to be given custodial sentences for breach of the order (Bateman, 2020), the current government's main approach towards severe forms of antisocial behaviour has been a punitive approach that responsabilises individuals. However, the findings of this study show that the likelihood of severe antisocial behaviour, including using a weapon and gang involvement, is greater among young people from highly deprived areas. This suggests that

an important part of any policy to reduce serious antisocial behaviour such as knife crime and gang involvement should be to reduce area level deprivation.

Another important finding of this study is the cross-level interactions, which show that the effects of individual and family level factors on antisocial behaviour are not same across different neighbourhoods (see section 8.3.2). This result suggests that in tackling antisocial behaviour, the application of different programmes and approaches is required that take into consideration the unique conditions of different neighbourhoods.

For example, having more drug taking friends is found to be associated with antisocial behaviour but the effect of drug taking friends on antisocial behaviour is greater when individuals live in a deprived neighbourhood (high rate of unemployment, bad health or no-central heating). In other words, even though some young people have friends who make trouble at school, the effect of this on their antisocial behaviour is greater when they live in a more deprived neighbourhood. Therefore, support programmes involving friends' effects for young people may work effectively in neighbourhoods with high deprivation but may not have the same effect in other areas. This raises the need for different policy responses and programmes to tackle antisocial behaviour and youth crime depending on the conditions in the area where young people live.

Therefore, a more localised approach is needed to tackle antisocial behaviour. As Taylor (2016) has recommended, many of the centralised statutory requirements placed upon youth offending teams need to be reduced. This would allow local authorities to have the autonomy to develop their own diversion schemes. Indeed, in recent years, more freedom has been given to local authorities, as the Coalition removed a number of the mechanisms for standardised youth justice practice. Due to the absence of a clear central narrative on youth justice and practice, there are now more local variations in the formation and delivery of youth justice than before (Kelly and Armitage, 2015). However, the recent localism aimed more at formally transferring powers and responsibilities to local authorities, neighbourhoods, and individuals. Despite the increased autonomy given to the local governments in delivering youth services, they are now struggling due to the extreme budget cuts. These budget pressures have made local authorities return to the risk-based approach, which has limited youth services to provision for only the young people from the most deprived families and areas (Davies, 2019; NYA, 2014).

To allow local areas to have their own diversion schemes, they should be able to form locally-appropriate partnerships between statutory agencies and professionals. Moreover, the role of experienced and qualified local youth workers should be emphasised in identifying which

programmes and approaches are effective for their own areas. Local partnerships, including experienced local youth workers, would then be able to decide, for example, whether the area needs more programmes on parenting or/and education, and whether they should provide a gender-specific or gender-neutral response, depending on the conditions of their area (e.g., the unemployment rate and level of deprivation). However, the recent budget cuts have led to many qualified youth workers being made redundant (Mason, 2015) and the remaining youth workers are now assigned to deal with more generic staff roles rather than to practice distinct roles, such as qualified youth workers (Puffett, 2012; Hughes et al., 2014). Thus, localism should be accompanied by sustainable budget/funding support that is not easily affected by political circumstances such as austerity. In this way, local authorities would be able to develop youth programmes that reflect the unique conditions of their areas. This could be applied to the existing programmes such as Youth Inclusion programmes.

In summary, the focus of policy approaches should be to support young people (especially vulnerable young people) and their families to meet their basic needs while listening to their voices. Moreover, support needs to be tailored to different local settings and circumstances. More importantly, the efforts should involve reducing the material inequalities that exist between different neighbourhoods. In addition, youth policy needs to promote more involvement of young people and enable them to develop the ability and skills they need to form appropriate informal networks of support in their neighbourhood and community.

This chapter has summarised the key findings of the thesis and identified its contributions to knowledge and methods and its implications in terms of policy. It has also recognised the limitations of the study and made suggestions for future research. The next chapter, which is the final chapter of the thesis, builds on this discussion and highlights the most important insights of this research.

Chapter 10. Conclusion

Since the 1990s, the main approach to tackling antisocial behaviour in England and Wales has been a punitive risk-oriented approach, while wider social and environmental effects on young people have been largely ignored by recent governments. Although recent governments have adopted some area level or localised approaches in dealing with antisocial behaviour, the focus has been more on recognising and targeting the most disadvantaged areas rather than making efforts to improve the material conditions of deprived neighbourhoods. Moreover, localism has been used more to responsabilise local authorities and local residents rather than to allow them to develop localised services to reduce antisocial behaviour. As the increased autonomy recently given to local governments coincided with extreme budget cuts, it led local authorities to return to a risk-oriented approach that limits youth services to the targeted young people from the most deprived families and areas.

Although some previous UK-based studies have attempted to address the relationship between neighbourhood characteristics and child outcomes (see for example, Odgers et al., 2009), there have not been many studies that have directly measured area level effects and examined their interaction with different individual and familial factors associated with antisocial behaviour using a large dataset that is representative of England and Wales. Thus, this study set out to address the evidence gaps within the research literature on antisocial behaviour among young people and the policy and programmatic void in considering wider social and environment effects in tackling antisocial behaviour. One of the major concerns of this study was to identify the neighbourhood level conditions that significantly explain antisocial behaviour among young people, over and above the effects of individual and familial level characteristics and the interactions that exist between them. This study also aimed to identify recommendations for youth policy and practice by providing evidence of the integrated effects of individual, family and neighbourhood level factors on antisocial behaviour among young people in England and Wales.

While the UK government has largely focused on a risk-based approach in dealing with antisocial behaviour among young people in England and Wales, the findings of this study demonstrate the importance of considering an integrated approach in reducing antisocial behaviour. The results of this study provide evidence of how, not only individual and family level characteristics, but also neighbourhood level conditions exert important effects on antisocial behaviour among young people. According to the findings of this study, several factors contribute to antisocial behaviour among young people. These include the influence of individual level factors but also the effects of family and neighbourhood conditions.

Broadly influenced by Bronfenbrenner's (1979) social ecological theory and neighbourhood process models (i.e., social disorganisation theory, the collective efficacy model and social capital theory), this study measured the effects of individual, family, and neighbourhood factors, and their interaction effects on antisocial behaviour. In order to adequately address the relationship between a variety of individual, family and neighbourhood level factors and antisocial behaviour, a validated antisocial behaviour measurement was constructed and used by this study. In developing the antisocial behaviour model, a number of factors that were drawn from the literature review of the empirical evidence of antisocial behaviour were included as independent variables, including individual (e.g., gender, illegal drug use, etc.), friends and family (e.g., drug taking friends, low household income, low parental supervision, etc.) and neighbourhood (e.g., high unemployment rate and housing and health deprivation) level factors.

Using count and categorical dependent variables, a series of multiple multinomial and Poisson regression analyses were conducted to address the individual and family level effects on antisocial behaviour. The findings of the individual and family level analysis suggest that the UK government should consider moving beyond the risk-based approach that makes a strict distinction between victims and perpetrators of antisocial behaviour and that heavily responsabilise individuals in England and Wales. In addition, a series of multilevel models were developed to examine neighbourhood level effects on antisocial behaviour and the complicated interrelated relationship between antisocial behaviour and individual, familial and neighbourhood factors. The findings from the neighbourhood level analysis also highlight how youth policy and practice should move beyond the risk-oriented approach that was prominent in the early 2000s, to an approach that considers wider neighbourhood effects in tackling antisocial behaviour and that is individualised to local areas. The findings from the area level analysis show that neighbourhood level conditions, including a high rate of unemployment, and housing or/and health deprivation, have significant effects on antisocial behaviour. This result suggests that approaches to tackling antisocial behaviour should involve efforts aimed at reducing area-level inequalities, such as making improvements to the health, housing and employment conditions of more deprived areas.

Moreover, the important role of the interactions between the surrounding environments in understanding antisocial behaviour among young people that has been suggested from the social ecological theory is supported by this study. Among the three social ecological systems adopted in this study (i.e., the microsystem, mesosystem and exosystem), the mesosystem (interactions between family and friend effects) and exosystem (neighbourhood effects and interactions between neighbourhood and lower-level factors) measured interaction effects in

predicting antisocial behaviour. The analysis of the interactions between the neighbourhood and individual/family-level factors and their effect on antisocial behaviour showed especially meaningful findings, in that, depending on where young people live, the individual and family level factors' effects on antisocial behaviour also varied. This result suggests that local areas should be allowed to have discretion to reflect their unique local conditions when adopting youth programmes/services.

This study has wide-ranging implications for discussions about the approach to tackling antisocial behaviour in England and Wales. It first argues that instead of focusing on the risk-oriented approach that makes a clear distinction between victims and perpetrators and that aims to responsabilise young people and their families, new youth justice policies should develop more supportive, inclusive and integrated approaches in tackling antisocial behaviour among young people. This can be done by developing and adopting programmes that do not stigmatise and target specific young people and that include a more general youth population and that are located outside of the youth justice system. The findings of this study further support policies that aim to reduce antisocial behaviour based on tackling the underlying structural deprivation (such as high unemployment rates and high levels of housing and health deprivation). Thus, the findings suggest that the provision of inclusive and supportive youth programmes (in tackling antisocial behaviour) needs to coincide with the provision of programmes that tackle area level inequalities/deprivation. Furthermore, the cross-level interaction analysis results demonstrate that area-based strategies that take a uniform approach to tackling antisocial behaviour are unlikely to be entirely successful as certain programmes, for example, focusing on the parental role, may work in one area but not be effective in another. This study adds valuable knowledge to the existing studies on antisocial behaviour by measuring cross-level interactions. Previous neighbourhood studies on antisocial behaviour have often examined neighbourhood effects on antisocial behaviour but not many studies have further investigated the interaction effects between neighbourhood level and individual level independent variables (see for example, Winslow and Shaw, 2007; Ingoldsby et al., 2006; Browning et al., 2008).

By addressing individual, family and neighbourhood level effects on antisocial behaviour among young people with an advanced methodological approach, this study has made several contributions to the existing knowledge. One of the important contributions of this study is that it extends the existing youth justice knowledge in England and Wales by adding new evidence regarding the determinants of antisocial behaviour. The findings, especially from the neighbourhood level analysis and cross-level interactions, provide meaningful policy and practice implications that suggest that there is a need to move beyond risk-based approaches.

Another core contribution of this thesis is that it provided a rigorous measurement framework for antisocial behaviour and conducted an advanced analysis that measures individual, family and neighbourhood effects on antisocial behaviour within the UK context. In measuring the hierarchical effects on antisocial behaviour among young people, it used multilevel modelling to test the effects on a national scale (England and Wales), rather than restricting it to one city or one county. In addition, this study used a more detailed group of neighbourhood measures than previous studies by combining census data with the sixth sweep of the Millennium Cohort Study. In addition, the findings of this thesis have wide ranging implications for current theories and social policies implemented not only in England and Wales but across countries that take similar approaches to the antisocial behaviour agenda; and social justice ideals based on the principle of providing a punitive risk-based approach as a means to reduce antisocial behaviour among young people.

Although this study extends our understanding of antisocial behaviour among young people in England and Wales, future studies could develop it further by adopting different approaches/methods (e.g., longitudinal data analysis, a qualitative approach and mixed methods). Future studies could operationalise five social ecological systems (Bronfenbrenner, 1979) including the two systems (namely macrosystems and chronosystems) that are not operationalised in this study in exploring the interconnected ecological systems' effects on antisocial behaviour in England and Wales. In addition, conducting a longitudinal multilevel analysis could help to specify the temporal relationship between the explanatory variables and antisocial behaviour and a qualitative approach could allow for an in-depth understanding of antisocial behaviour among young people. Some of the limitations that stem from the neighbourhood study itself, such as the modifiable areal unit problem and selection bias, are issues that cannot be easily addressed. However, different approaches that have been suggested to handle these issues (e.g., multiscale and multizonal systems analysis) could be adopted in future neighbourhood studies on antisocial behaviour.

Overall, this study has met its major objectives by answering the research questions: it identified the individual, family and neighbourhood level factors that are significantly associated with antisocial behaviour; and addressed the interaction effects between the individual and family level factors and between the neighbourhood and lower-level factors. The findings of this study allowed the work to develop the evidence base on area effects on antisocial behaviour and their interactions with individual and familial characteristics using a large representative dataset of young people in England and Wales. Furthermore, this study has provided a basis for policy recommendations by developing evidence of the integrated effects of individual, family, and neighbourhood level factors on antisocial behaviour among

young people. Thus, the findings from this study can be used as evidence to reshape the contents and objectives of social policies and also as a means to underline the role that the government must have in reducing antisocial behaviour in England and Wales. This would help to shift the focus from risk-based punitive approaches to the social ecological approach, which considers the importance of wider environmental effects and surrounding environments' interaction effects on antisocial behaviour among children and young people.

References

- Adwards, A., Hughes, G. and Swann, R. (2015) 'Community safety and the policing of young people in austere times', in Goldson, B. & Muncie, J. (eds.) *Youth crime and justice*. London: Sage, pp.191-208.
- Aguilar, B., Sroufe, L. A., Egeland, B. and Carlson, E. (2000) 'Distinguishing the early-onset/persistent and adolescence-onset antisocial behavior types: From birth to 16 years', *Development and Psychopathology*, 12(2), pp. 109-132.
- Akers, R. L. (2013) *Criminological theories: Introduction and evaluation*. New York: Routledge.
- Álvarez-García, D., González-Castro, P., Núñez, J. C., Rodríguez, C. and Cerezo, R. (2019) 'Impact of family and friends on antisocial adolescent behavior: The mediating role of impulsivity and empathy', *Frontiers in Psychology*, 10, pp. 2071.
- Amato, P. R. and Keith, B. (1991) 'Parental divorce and the well-being of children: a meta-analysis', *Psychological Bulletin*, 110(1), pp. 26-46.
- An, X. and Yung, Y.-F. (2014) Item response theory: what it is and how you can use the IRT procedure to apply it. SAS Institute Inc.
- Anderson, A. L. (2002) 'Individual and contextual influences on delinquency: the role of the single-parent family', *Journal of Criminal Justice*, 30(6), pp. 575-587.
- Anderson, S., Donlan, A. E., McDermott, E. R. and Zaff, J. F. (2015) 'Ecology matters: Neighborhood differences in the protective role of self-control and social support for adolescent antisocial behavior', *American Journal of Orthopsychiatry*, 85(6), pp. 536-549.
- Angell, R. C. (1936) 'The family encounters the Depression', *Charles Scribner*.
- Apel, R. and Kaukinen, C. (2008) 'On the relationship between family structure and antisocial behavior: Parental cohabitation and blended households', *Criminology*, 46(1), pp. 35-70.
- Arai, L. (2003) 'Low expectations, sexual attitudes and knowledge: explaining teenage pregnancy and fertility in English communities. Insights from qualitative research', *The Sociological Review*, 51(2), pp. 199-217.
- Arai, L. (2007) 'Peer and neighbourhood influences on teenage pregnancy and fertility: Qualitative findings from research in English communities', *Health & Place*, 13(1), pp. 87-98.
- Armstrong, D., Hine, J., Hacking, S., Armaos, R., Jones, R., Klessinger, N. and France, A. (2005) Children, risk and crime: The on track lifestyles surveys. London: Home Office.
- Arseneault, L., Moffitt, T. E., Caspi, A., Taylor, A., Rijdsdijk, F. V., Jaffee, S. R., Ablow, J. C. and Measelle, J. R. (2003) 'Strong genetic effects on cross-situational antisocial behaviour among 5-year-old children according to mothers, teachers, examiner-observers, and twins' self-reports', *Journal of Child Psychology and Psychiatry*, 44(6), pp. 832-848.
- Astone, N. M. and McLanahan, S. S. (1991) 'Family structure, parental practices and high school completion', *American Sociological Review*, 56(3), pp. 309-320.
- Astone, N. M. and McLanahan, S. S. (1994) 'Family structure, residential mobility, and school dropout: A research note', *Demography*, 31(4), pp. 575-584.
- Atzaba-Poria, N. and Pike, A. (2007) 'Are ethnic minority adolescents at risk for problem behaviour? Acculturation and intergenerational acculturation discrepancies in early adolescence', *British Journal of Developmental Psychology*, 25(4), pp. 527-541.
- Bagwell, C. L. (2004) 'Friendships, peer networks, and antisocial behavior', in Kupersmidt, J. B. & Dodge, K. A. (eds.) *Children's peer relations: From development to intervention*. American Psychological Association, pp.37-57.
- Baldry, A. C. and Farrington, D. P. (2000) 'Bullies and delinquents: Personal characteristics and parental styles', *Journal of Community & Applied Social Psychology*, 10(1), pp. 17-31.
- Bandalos, D. L. and Finney, S. J. (2018) 'Factor analysis: Exploratory and confirmatory', in Hancock, G. R., Stapleton, L. M. & Mueller, R. O. (eds.) *The reviewer's guide to quantitative methods in the social sciences*. Routledge, pp.98-122.

- Bank, L., Burraston, B. and Snyder, J. (2004) 'Sibling Conflict and Ineffective Parenting as Predictors of Adolescent Boys' Antisocial Behavior and Peer Difficulties: Additive and Interactional Effects', *Journal of Research on Adolescence*, 14(1), pp. 99-125.
- Bank, L., Patterson, G. R. and Reid, J. B. (1996) 'Negative sibling interaction patterns as predictors of later adjustment problems in adolescent and young adult males', in Brody, G. H. (ed.) *Advances in applied developmental psychology: Sibling relationships*. Ablex Publishing: Norwood, pp.179-229.
- Barker, E. D. and Maughan, B. (2009) 'Differentiating early-onset persistent versus childhood-limited conduct problem youth', *American Journal of Psychiatry*, 166(8), pp. 900-908.
- Barnes, G. M., Welte, J. W. and Hoffman, J. H. (2002) 'Relationship of alcohol use to delinquency and illicit drug use in adolescents: Gender, age, and racial/ethnic differences', *Journal of Drug Issues*, 32(1), pp. 153-178.
- Barry, M. (2007) 'Youth offending and youth transitions: the power of capital in influencing change', *Critical Criminology*, 15(2), pp. 185-198.
- Bartusch, D. R. J., Lynam, D. R., Moffitt, T. E. and Silva, P. A. (1997) 'Is age important? Testing a general versus a developmental theory of antisocial behavior', *Criminology*, 35(1), pp. 13-48.
- Bateman, T. (2014) 'Where has all the youth crime gone? Youth justice in an age of austerity', *Children & Society*, 28(5), pp. 416-424.
- Bateman, T. (2016) *The state of youth custody*. London: NAYJ.
- Bateman, T. (2020) *The state of youth justice 2020: An overview of trends and developments*. National Association for Youth Justice.
- Beaver, K. M. (2013) *Biosocial criminology: A primer*. Dubuque, IA: Kendall-Hunt Publishing.
- Beaver, K. M., Schwartz, J. A. and Gajos, J. M. (2015) 'A review of the genetic and gene–environment interplay contributors to antisocial phenotypes', in Morizot, J. & Kazemian, L. (eds.) *The development of criminal and antisocial behavior*. London: Springer, pp.109-122.
- Beckett, K. (1997) *Making crime pay: Law and order in contemporary American politics*. New York: Oxford University Press.
- Bell, E. (2018) 'The Decline of Penal Populism in the UK?', *British Society of Criminology*, 83(Winterthe), pp. 11-15.
- Bendixen, M. and Olweus, D. (1999) 'Measurement of antisocial behaviour in early adolescence and adolescence: psychometric properties and substantive findings', *Criminal Behaviour and Mental Health*, 9, pp. 323-354.
- Benzies, K. and Mychasiuk, R. (2009) 'Fostering family resiliency: A review of the key protective factors', *Child & Family Social Work*, 14(1), pp. 103-114.
- Berti, C. and Pivetti, M. (2019) 'Childhood economic disadvantage and antisocial behavior: Intervening factors and pathways', *Children and Youth Services Review*, 97, pp. 120-126.
- Besemer, S., Ahmad, S. I., Hinshaw, S. P. and Farrington, D. P. (2017) 'A systematic review and meta-analysis of the intergenerational transmission of criminal behavior', *Aggression and Violent Behavior*, 37, pp. 161-178.
- Bevir, M. (2005) *New Labour: a critique* Oxford: Routledge.
- Beyers, J. M., Loeber, R., Wikström, P. H. and Stouthamer-Loeber, M. (2001) 'What predicts adolescent violence in better-off neighborhoods?', *Journal of Abnormal Child Psychology*, 29(5), pp. 369-381.
- Bichi, A. A. and Talib, R. (2018) 'Item Response Theory: An Introduction to Latent Trait Models to Test and Item Development', *International Journal of Evaluation and Research in Education*, 7(2), pp. 142-151.
- Blair, T. (1995) *Leader's speech, Brighton 1995*. Brighton: British Political Speech. Available at: <http://www.britishpoliticalspeech.org/speech-archive.htm?speech=201> (accessed 05 May 2017).
- Blair, T. (2010) *A journey: My political life*. London: Hutchinson.

- Bor, W., McGee, T. R. and Fagan, A. A. (2004) 'Early risk factors for adolescent antisocial behaviour: An Australian longitudinal study', *Australian and New Zealand Journal of Psychiatry*, 38(5), pp. 365-372.
- Boslaugh, S. (2007) *Secondary data sources for public health: A practical guide*. Cambridge: Cambridge University Press.
- Bradley, C. A. (2017) *Risk and protective factors of sibling physical conflict for children in the UK*. PhD thesis, University of Bristol.
- Bradshaw, J., Noble, M., Bloor, K., Huby, M., McLennan, D., Rhodes, D., Sinclair, I. and Wilkinson, K. (2009) 'A child well-being index at small area level in England', *Child Indicators Research*, 2(2), pp. 201-219.
- Brody, G. H., Stoneman, Z., Flor, D., McCrary, C., Hastings, L. and Conyers, O. (1994) 'Financial Resources, Parent Psychological Functioning, Parent Co-Caregiving, and Early Adolescent Competence in Rural Two-Parent African-American Families', *Child development*, 65(2), pp. 590-605.
- Bronfenbrenner, U. (1979) *The ecology of human development: Experiments by nature and design*. Cambridge: Harvard University Press.
- Bronfenbrenner, U. (1981) *Ecology of human development: Experiments by nature and design*. Cambridge: Harvard university press.
- Bronfenbrenner, U. (1994) 'Ecological models of human development', in Gauvain, M. & Cole, M. (eds.) *Readings on the development of children*. New York: Freeman, pp.37-43.
- Brown, E. L. (2019) *Knife crime: causes and solutions – editors' guide to what our academic experts say*. The Conversation. Available at: <http://theconversation.com/knife-crime-causes-and-solutions-editors-guide-to-what-our-academic-experts-say-113318> (accessed 04 June 2019).
- Brown, G. (2007) *House of Commons Hansard*. Available at: <https://www.publications.parliament.uk/pa/cm200607/cmhansrd/cm071010/debtext/71010-0003.htm> (accessed 05 May 2017).
- Brown, M. and Bolling, K. (2007) *Drugs misuse in Scotland: findings from the 2006 Scottish Crime and Victimization Survey*. Edinburgh: Scottish Government Social Research.
- Browning, C. R., Burrington, L. A., Leventhal, T. and Brooks-Gunn, J. (2008) 'Neighborhood structural inequality, collective efficacy, and sexual risk behavior among urban youth', *Journal of Health and Social Behavior*, 49(3), pp. 269-285.
- Bruce, M. A. (2004) 'Inequality and adolescent violence: An exploration of community, family, and individual factors', *Journal of the National Medical Association*, 96(4), pp. 486-495.
- Bruinsma, G. J., Pauwels, L. J., Weerman, F. M. and Bernasco, W. (2013) 'Social disorganization, social capital, collective efficacy and the spatial distribution of crime and offenders: An empirical test of six neighbourhood models for a Dutch city', *British Journal of Criminology*, 53(5), pp. 942-963.
- Buka, S. and Earls, F. (1993) 'Early determinants of delinquency and violence', *Health Affairs*, 12(4), pp. 46-64.
- Bullock, B. M. and Dishion, T. J. (2002) 'Sibling collusion and problem behavior in early adolescence: Toward a process model for family mutuality', *Journal of Abnormal Child Psychology*, 30(2), pp. 143-153.
- Burney, E. (2005) *Making people behave: Anti-social behaviour, politics and policy*. Devon: Willan Publishing.
- Burney, E. (2008) 'The ASBO and the shift to punishment', in Squires, P. (ed.) *ASBO Nation: The criminalisation of nuisance*. Bristol: The Policy Press, pp.135-148.
- Bursik, R. and Grasmick, H. (1993a) *Neighborhoods and crime: The dimensions of effective social control*. New York: Lexington Books.
- Bursik, R. J. (1988) 'Social disorganization and theories of crime and delinquency: Problems and prospects', *Criminology*, 26(4), pp. 519-552.

- Bursik, R. J. and Grasmick, H. G. (1993b) *Neighborhoods and crime: The dimensions of effective community control*. Lanham: Lexington Books.
- Burt, C. (1925) *The young delinquent*. London: University of London Press.
- Burt, S. A. and Donnellan, M. B. (2009) 'Development and Validation of the Subtypes of Antisocial Behavior Questionnaire', *Aggressive Behaviour*, 35, pp. 376-398.
- Burt, S. A., Slawinski, B. L. and Klump, K. L. (2018) 'Are there sex differences in the etiology of youth antisocial behavior?', *Journal of Abnormal Psychology*, 127(1), pp. 66-78.
- Buzzelli, M. (2020) 'Modifiable areal unit problem', *International Encyclopedia of Human Geography*, 9, pp. 169-173.
- Byrne, J. M. and Sampson, R. J. (1986) 'Key issues in the social ecology of crime', in *The social ecology of crime*. New York: Springer, pp.1-22.
- Byrnes, H. F., Miller, B. A., Morrison, C. N., Wiebe, D. J., Woychik, M. and Wiehe, S. E. (2017) 'Association of environmental indicators with teen alcohol use and problem behavior: Teens' observations vs. objectively-measured indicators', *Health & Place*, 43, pp. 151-157.
- Carlisi, C. O., Moffitt, T. E., Knodt, A. R., Harrington, H., Ireland, D., Melzer, T. R., Poulton, R., Ramrakha, S., Caspi, A. and Hariri, A. R. (2020) 'Associations between life-course-persistent antisocial behaviour and brain structure in a population-representative longitudinal birth cohort', *The Lancet Psychiatry*, 7(3), pp. 245-253.
- Carpenter, J. and Kenward, M. (2007) *Guidelines for handling missing data in social science research*. Available at: www.missingdata.org.uk (accessed 26 Mar 2019).
- Carr, J. A. (2003) *The geographies of young people, crime and social exclusion*. PhD thesis, The University of Leeds.
- Carroll, S. L., Clark, D. A., Hyde, L. W., Klump, K. L. and Burt, S. A. (2021) 'Continuity and change in the genetic and environmental etiology of youth antisocial behavior', *Behavior Genetics*, 51(5), pp. 580-591.
- Case, S. (2018) *Youth justice: A critical introduction*. Abingdon: Routledge.
- Case, S. and Haines, K. (2009) *Understanding youth offending: Risk factor research, policy and practice*. Cullompton: Willan.
- Case, S. and Haines, K. (2018) 'The future of youth justice', *Youth Justice*, 18(2), pp. 131-148.
- Case, S. and Haines, K. (2019) *Knife crime: Children are not the problem, they are part of the solution*. The Conversation. Available at: <https://theconversation.com/knife-crime-children-are-not-the-problem-they-are-part-of-the-solution-106893> (accessed 04 June 2019).
- Cavan, R. S. and Ranck, K. H. (1938) *The family and the depression*. Chicago: University of Chicago Press.
- Centre for Longitudinal Studies (2014) Millennium Cohort Study – Ethical review and Consent. London: Centre for Longitudinal Studies, Institute of Education, University of London.
- Cernkovich, S. A. and Giordano, P. C. (1992) 'School bonding, race, and delinquency', *Criminology*, 30(2), pp. 261-291.
- Chiesi, F., Primi, C., Pigliautile, M., Ercolani, S., Della Staffa, M. C., Longo, A., Boccardi, V. and Mecocci, P. (2017) 'The local reliability of the 15-item version of the Geriatric Depression Scale: An item response theory (IRT) study', *Journal of Psychosomatic Research*, 96, pp. 84-88.
- Childs, K. K., Brady, C. M., Cameron, A. L. and Kaukinen, C. (2022) 'The role of family structure and family processes on adolescent problem behavior', *Deviant Behavior*, 43(1), pp. 1-16.
- Choy, L. T. (2014) 'The strengths and weaknesses of research methodology: Comparison and complimentary between qualitative and quantitative approaches', *IOSR Journal of Humanities and Social Science*, 19(4), pp. 99-104.
- Chung, H. L. and Steinberg, L. (2006) 'Relations between neighborhood factors, parenting behaviors, peer deviance, and delinquency among serious juvenile offenders', *Developmental Psychology*, 42(2), pp. 319.
- Chung, I.-J. (2003) 'A Conceptual Framework for Understanding the Relationship Between Poverty and Antisocial Behavior: Focusing on Psychosocial Mediating Mechanisms', *The Journal of Primary Prevention*, 3(24), pp. 375-400.

- CICA, I. S. (1997) ACORN user guide. London: CACI.
- Cohen, S. (2002) *Folk devils and moral panics: The creation of the mods and rockers*. Abingdon: Psychology Press.
- Cohn, E. G. and Farrington, D. P. (2008) 'Scholarly influence in criminology and criminal justice journals in 1990–2000', *Journal of Criminal Justice*, 36(1), pp. 11-21.
- Coleman, J. (1990) *Foundations of social theory*. Cambridge: Harvard University Press.
- Collishaw, S., Gardner, F., Maughan, B., Scott, J. and Pickles, A. (2012) 'Do historical changes in parent–child relationships explain increases in youth conduct problems?', *Journal of Abnormal Child Psychology*, 40(1), pp. 119-132.
- Conger, R. D., Ge, X., Elder, G. H., Lorenz, F. O. and Simons, R. L. (1994) 'Economic stress, coercive family process, and developmental problems of adolescents', *Child Development*, 65(2), pp. 541-561.
- Crawford, A. (2009) 'Governing Through Anti-Social Behaviour: Regulatory Challenges to Criminal Justice', *British Journal of Criminology*, (49).
- Crawford, A. and Evans, K. (2012) 'Crime prevention and community safety', in Maguire, M., Morgan, R. & Reiner, R. (eds.) *The Oxford handbook of criminology*. 5th ed. Oxford: Oxford University Press,
- Crawford, A. and Evans, K. (2017) 'Crime prevention and community safety', in Liebling, A., Maruna, S. & McAra, L. (eds.) *The Oxford handbook of criminology*. 6th ed. Oxford: Oxford University Press, pp.797-824.
- Crime and Disorder Act (1998) Crime and Disorder Act.
- Crockett, L. J. and Petersen, A. C. (1987) 'Pubertal status and psychosocial development: Findings from the early adolescence study', in Lerner, R. M. & Foch, T. (eds.) *Biological–psychosocial interactions in early adolescence*. New Jersey: Lawrence Erlbaum Associates, pp.173-188.
- Cross, J. and William, E. (2017) 'Ecological factors in human development', *Child Development*, 88(3), pp. 767-769.
- Cuervo, K., Villanueva, L., Born, M. and Gavray, C. (2018) 'Analysis of violent and non-violent versatility in self-reported juvenile delinquency', *Psychiatry, Psychology and Law*, 25(1), pp. 72-85.
- Cuevas, C. A., Finkelhor, D., Turner, H. A. and Ormrod, R. K. (2007) 'Juvenile delinquency and victimization: A theoretical typology', *Journal of Interpersonal Violence*, 22(12), pp. 1581-1602.
- Curley, C., Krause, R. M., Feiock, R. and Hawkins, C. V. (2019) 'Dealing with missing data: A comparative exploration of approaches using the integrated city sustainability database', *Urban Affairs Review*, 55(2), pp. 591-615.
- Cutrín, O., Maneiro, L., Sobral, J. and Gómez-Fraguela, J. A. (2018) 'Longitudinal effects of parenting mediated by deviant peers on violent and non-violent antisocial behaviour and substance use in adolescence', *European Journal of Psychology Applied to Legal Context*, 11(1), pp. 23-32.
- D'Amico, E. J., Edelen, M. O., Miles, J. N. and Morral, A. R. (2008) 'The longitudinal association between substance use and delinquency among high-risk youth', *Drug and Alcohol Dependence*, 93(1-2), pp. 85-92.
- Dahlberg, L. L. (1998) 'Youth violence in the United States: Major trends, risk factors, and prevention approaches', *American Journal of Preventive Medicine*, 14(4), pp. 259-272.
- Davidson, E. (2012) *Young people and the everyday antisocial*. PhD thesis, The University of Edinburgh.
- Davies, B. (2019) *Austerity, youth policy and the deconstruction of the youth Service in England*. Warkwickshire: Palgrave Macmillan.
- Deković, M., Janssens, J. M. and As, N. (2003) 'Family predictors of antisocial behavior in adolescence', *Family Process*, 42(2), pp. 223-235.
- Deković, M., Wissink, I. B. and Meijer, A. M. (2004) 'The role of family and peer relations in adolescent antisocial behaviour: comparison of four ethnic groups', *Journal of Adolescence*, 27(5), pp. 497-514.
- DeLisi, M. (2011) 'Self-control theory: The tyrannosaurus rex of criminology is poised to devour criminal justice', *Journal of Criminal Justice*, 2(39), pp. 103-105.

- DeLisi, M., Beaver, K. M., Vaughn, M. G. and Wright, J. P. (2009) 'All in the family: Genex environment interaction between DRD2 and criminal father is associated with five antisocial phenotypes', *Criminal Justice and Behavior*, 36(11), pp. 1187-1197.
- Dembo, R., Williams, L., Getreu, A., Genung, L., Schmeidler, J., Berry, E., Wish, E. D. and La Voie, L. (1991) 'A longitudinal study of the relationships among marijuana/hashish use, cocaine use and delinquency in a cohort of high risk youths', *Journal of Drug Issues*, 21(2), pp. 271-312.
- Densley, J., Deuchar, R. and Harding, S. (2020) 'An Introduction to Gangs and Serious Youth Violence in the United Kingdom', *Youth Justice*, 20(1-2), pp. 3-10.
- Department for Communities and Local Government (2015) The Troubled Families programme Financial framework for the Troubled Families programme's payment-by-results scheme for local authorities. London: Department for Communities and Local Government.
- Diez-Roux, A.-V. (2007) 'Neighborhoods and health: where are we and where do we go from here?', *Revue d'épidémiologie et de santé publique*, 55(1), pp. 13-21.
- DiLalla, L. F. and Gottesman, I. I. (1989) 'Heterogeneity of causes for delinquency and criminality: Lifespan perspectives', *Development and Psychopathology*, 1(4), pp. 339-349.
- Dishion, T. and Patterson, G. (2015) 'The development and ecology of antisocial behaviour in children and adolescents', in Cicchetti, D. & Cohen, D. J. (eds.) *Developmental Psychopathology: Volume Three: Risk, Disorder, and Adaptation*. New Jersey: John Wiley & Sons, Inc, pp.503-541.
- Dishion, T. J., Andrews, D. W. and Crosby, L. (1995) 'Antisocial boys and their friends in early adolescence: Relationship characteristics, quality, and interactional process', *Child development*, 66(1), pp. 139-151.
- Downes, D. (2007) 'Editorial: Ten years on', *Criminal Justice Matters*, 67(Spring).
- Downes, D. and Morgan, R. (2007a) 'No turning back: The politics of law and order into the millennium', in Maguire, M., Morgan, R. & Reiner, R. (eds.) *The Oxford handbook of criminology*. 4th ed. Oxford: Oxford University Press,
- Downes, D. and Morgan, R. (2007b) 'The politics of law and order', in Maguire, M., Morgan, R. & Reiner, R. (eds.) *The Oxford handbook of criminology*. Oxford: Oxford University Press,
- Dubow, E. F. and Ippolito, M. F. (1994) 'Effects of poverty and quality of the home environment on changes in the academic and behavioral adjustment of elementary school-age children', *Journal of Clinical Child Psychology*, 23(4), pp. 401-412.
- Dugdale, R. (1910) *The Jukes*. New York: Putnam.
- Eamon, M. K. (2002) 'Poverty, parenting, peer, and neighborhood influences on young adolescent antisocial behavior', *Journal of Social Service Research*, 28(1), pp. 1-23.
- Eastman, O. (2006) *The association between parenting and child antisocial behaviour: A role for moderating factors?*, University of London.
- Echazarra, A. (2012) *Social disorganisation, immigration and perceived crime in Spanish neighbourhoods*. The University of Manchester (United Kingdom).
- Elliott, D. S., Wilson, W. J., Huizinga, D., Sampson, R. J., Elliott, A. and Rankin, B. (1996) 'The effects of neighborhood disadvantage on adolescent development', *Journal of Research in Crime and Delinquency*, 33(4), pp. 389-426.
- Ellis, T. and Kyo, A. (2019) 'Youth justice in England & Wales: past, present and future', *Ryukoku Corrections and Rehabilitation Center Journal*, 8(1), pp. 64-92.
- Ennett, S. T., Foshee, V. A., Bauman, K. E., Hussong, A., Cai, L., Reyes, H. L. M., Faris, R., Hipp, J. and DuRant, R. (2008) 'The social ecology of adolescent alcohol misuse', *Child Development*, 79(6), pp. 1777-1791.
- Esposito, C., Affuso, G., Miranda, M. C. and Bacchini, D. (2020) 'A new dimensional measure of antisocial behaviour evaluation (ASBE)', *European Journal of Developmental Psychology*, pp. 1-14.

- Estévez, E. and Emler, N. (2011) 'Assessing the links among adolescent and youth offending, antisocial behaviour, victimization, drug use, and gender', *International Journal of Clinical and Health Psychology*, 11(2), pp. 269-289.
- Fabio, A., Chen, C.-Y. and Bazaco, M. C. (2012) 'Neighborhood influence on the development of aggression and youth violence', in Thomas, C. R. & Pope, K. (eds.) *The origins of antisocial behavior: A developmental perspective*. Oxford: Oxford University Press,
- Fagan, A. A., Wright, E. M. and Pinchevsky, G. M. (2014) 'The protective effects of neighborhood collective efficacy on adolescent substance use and violence following exposure to violence', *Journal of Youth and Adolescence*, 43(9), pp. 1498-1512.
- Fagg, J. (2009) *Neighbourhood deprivation and self-esteem: Is there equalisation in early adolescence?* PhD thesis, Queen Mary, University of London.
- Fahmy, E., Gordon, D., Dorling, D., Rigby, J. and Wheeler, B. (2011) 'Poverty and place in Britain, 1968–99', *Environment and Planning A*, 43(3), pp. 594-617.
- Farrington, D. P. (1990) 'Implications of criminal career research for the prevention of offending', *Journal of Adolescence*, 13(2), pp. 93-113.
- Farrington, D. P. (1992) 'Criminal career research in the United Kingdom', *British Journal of Criminology*, 32(4), pp. 521-550.
- Farrington, D. P. (1994) 'Early developmental prevention of juvenile delinquency', *RSA Journal*, 142(5454), pp. 22-34.
- Farrington, D. P. (2005) 'Childhood origins of antisocial behavior', *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, 12(3), pp. 177-190.
- Farrington, D. P., Barnes, G. C. and Lambert, S. (1996) 'The concentration of offending in families', *Legal and Criminological Psychology*, 1(1), pp. 47-63.
- Farrington, D. P., Jolliffe, D. and Loeber, R. (2001) 'The concentration of offenders in families, and family criminality in the prediction of boys' delinquency', *Journal of Adolescence*, 24(5), pp. 579-596.
- Farrington, D. P., Sampson, R. J. and Wikström, P.-O. H. (1993) *Integrating individual and ecological aspects of crime*. Stockholm: National Council for Crime Prevention.
- Felson, R., Savolainen, J., Aaltonen, M. and Moustgaard, H. (2008) 'Is the association between alcohol use and delinquency causal or spurious?', *Criminology*, 46(3), pp. 785-808.
- Flatley, J., Moley, S. and Hoare, J. (2008) 'Perceptions of anti-social behaviour: Findings from the 2007/08 British Crime Survey', *Home Office Statistical Bulletin 15*, 8(1).
- Flewelling, R. L. and Bauman, K. E. (1990) 'Family structure as a predictor of initial substance use and sexual intercourse in early adolescence', *Journal of Marriage and the Family*, 52, pp. 171-181.
- Flint, J. and Nixon, J. (2006) 'Governing neighbours: Anti-social Behaviour Orders and new forms of regulating conduct in the UK', *Urban Studies*, 43(5-6), pp. 939-955.
- Flood-Page, C., Campbell, S., Harrington, V. and Miller, J. (2000) *Youth crime: Findings from the 1998/99 Youth Lifestyles Survey*. London: Home Office.
- Flouri, E., Mavroveli, S. and Midouhas, E. (2013) 'Residential mobility, neighbourhood deprivation and children's behaviour in the UK', *Health & Place*, 20, pp. 25-31.
- Flouri, E., Mavroveli, S. and Tzavidis, N. (2012) 'Cognitive ability, neighborhood deprivation, and young children's emotional and behavioral problems', *Social Psychiatry and Psychiatric Epidemiology*, 47(6), pp. 985-992.
- Flouri, E., Midouhas, E. and Francesconi, M. (2020) 'Neighbourhood deprivation and child behaviour across childhood and adolescence', *Longitudinal and Life Course Studies*, 11(2), pp. 203-227.
- Flouri, E., Midouhas, E. and Joshi, H. (2014) 'The role of urban neighbourhood green space in children's emotional and behavioural resilience', *Journal of Environmental Psychology*, 40, pp. 179-186.
- Flouri, E., Midouhas, E. and Joshi, H. (2015) 'Family and neighbourhood risk and children's problem behaviour: The moderating role of intelligence', *Intelligence*, 53, pp. 33-42.

- Flouri, E., Tzavidis, N. and Kallis, C. (2010) 'Area and family effects on the psychopathology of the Millennium Cohort Study children and their older siblings', *Journal of Child Psychology and Psychiatry*, 51(2), pp. 152-161.
- Fotheringham, A. S. and Wong, D. W. (1991) 'The modifiable areal unit problem in multivariate statistical analysis', *Environment and Planning A*, 23(7), pp. 1025-1044.
- France, A., Bottrell, D. and Armstrong, D. (2012) *A political ecology of youth and crime*. Hampshire: Palgrave Macmillan.
- Fraser, A. and Hobbs, D. (2017) 'Urban criminal collaborations', in Liebling, A., Maruna, S. & McAra, L. (eds.) *The Oxford handbook of criminology*. 6th ed. Oxford: Oxford University Press, pp.587-606.
- Frick, P. J. and Dickens, C. (2006) 'Current perspectives on conduct disorder', *Current psychiatry reports*, 8(1), pp. 59-72.
- Frick, P. J., Lahey, B. B., Loeber, R., Stouthamer-Loeber, M., Christ, M. A. G. and Hanson, K. (1992) 'Familial risk factors to oppositional defiant disorder and conduct disorder: parental psychopathology and maternal parenting', *Journal of Consulting and Clinical Psychology*, 60(1), pp. 49.
- Gard, A. M., McLoyd, V. C., Mitchell, C. and Hyde, L. W. (2020) 'Evaluation of a longitudinal family stress model in a population-based cohort', *Social Development*, 29(4), pp. 1155-1175.
- Garside, R. (2015) *Current criminal justice policy and the legacy of coalition*. London: Centre for Crime and Justice Studies. Available at: <https://www.crimeandjustice.org.uk/resources/current-criminal-justice-policy-and-legacy-coalition> (accessed 05 June 2017).
- Gatti, U. (2014) 'Social capital and crime', in Caneppele, S. & Calderoni, F. (eds.) *Organized Crime, Corruption and Crime Prevention*. London: Springer,
- Gearhart, M. C. (2019) 'Preventing neighborhood disorder: Comparing alternative models of collective efficacy theory using structural equation modeling', *American Journal of Community Psychology*, 63(1-2), pp. 168-178.
- Gelsthorpe, L. and Morris, A. (1994) 'Juvenile justice 1945–1992', in Maguire, M., Morgan, A. & Reiner, R. (eds.) *The Oxford handbook of criminology*. Oxford: Oxford University Press,
- George, D. and Mallery, P. (2003) *SPSS for windows step by step: A simple study guide and reference*. Boston: Allyn & Bacon.
- Gibbons, S. (2002) *Neighbourhood effects on educational achievement*. Centre for the Economics of Education, London School of Economics and Political Science.
- Gil-Robles, A. (2005) Report by Mr Alvaro Gil-Robles, Commissioner for Human Rights, on his visit to the United Kingdom 4-12 November 2004. Strasbourg: Office of the Commissioner for Human Rights.
- Gillham, B., Tanner, G., Cheyne, B., Freeman, I., Rooney, M. and Lambie, A. (1998) 'Unemployment rates, single parent density, and indices of child poverty: Their relationship to different categories of child abuse and neglect', *Child Abuse & Neglect*, 22(2), pp. 79-90.
- Gliem, J. A. and Gliem, R. R. (2003) Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Midwest Research-to-Practice Conference in Adult, Continuing, and Community.
- Goldstein, P. J. (1985) 'The drugs/violence nexus: A tripartite conceptual framework', *Journal of Drug Issues*, 15(4), pp. 493-506.
- Gordon, D. (2012) Why use relative risks? *Statistical Briefing Note No 1*. Economic and Social Research Council.
- Goring, C. (1913) *The English convict*. London: Methuen.
- Gottfredson, M. R. and Hirschi, T. (1990) *A general theory of crime*. Stanford, CA: Stanford University Press.
- Graham, J. (2012) 'Responding to youth crime', in Smith, D. (ed.) *A new response to youth crime*. 2nd ed. Oxson: Routledge, pp.104-142.

- Graif, C. (2015) 'Delinquency and gender moderation in the moving to opportunity intervention: The role of extended neighborhoods', *Criminology*, 53(3), pp. 366-398.
- Granovetter, M. S. (1973) 'The Strength of Weak Ties', *American Journal of Sociology*, 78(6), pp. 1360-1380.
- Grimwood, G. and Strickland, P. (2013) *Young Offenders: What Next?* London: House of Commons Library.
- Guio, A.-C., Gordon, D. and Marlier, E. (2012) *Measuring material deprivation in the EU: Indicators for the whole population and child-specific indicators*. Luxembourg: Eurostat.
- Guio, A.-C., Gordon, D., Najera, H. and Pomati, M. (2017) *Revising the EU material deprivation variables*. Luxembourg: Eurostat.
- Guo, J. Y. and Bhat, C. R. (2004) 'Modifiable areal units: problem or perception in modeling of residential location choice?', *Transportation Research Record*, 1898(1), pp. 138-147.
- Gutman, L. M., Joshi, H., Parsonage, M. and Schoon, I. (2018) 'Gender-specific trajectories of conduct problems from ages 3 to 11', *Journal of Abnormal Child Psychology*, 46(7), pp. 1467-1480.
- Guy-Evans, O. (2020) *Bronfenbrenner's ecological systems theory. Simply Psychology*. Available at: <https://www.simplypsychology.org/Bronfenbrenner.html> (accessed 26 April 2021).
- Habibova, N. N. and Afandi, E. N. (2011) 'Self-rated health and social capital in transitional countries: Multilevel analysis of comparative surveys in Armenia, Azerbaijan, and Georgia', *Social Science & Medicine*, 72, pp. 1193-1204.
- Hammerton, G., Mahedy, L., Murray, J., Maughan, B., Edwards, A. C., Kendler, K. S., Hickman, M. and Heron, J. (2017) 'Effects of excessive alcohol use on antisocial behavior across adolescence and early adulthood', *Journal of the American Academy of Child & Adolescent Psychiatry*, 56(10), pp. 857-865.
- Hampson, K. S. (2018) 'Desistance Approaches in youth justice: The next passing fad or a sea-change for the positive?', *Youth Justice* 18(1), pp. 18-33.
- Harding, S. (2020) 'Getting to the point? Reframing Narratives on knife crime', *Youth Justice*, 20(1-2), pp. 31-49.
- Harpur, T. J., Hakstian, A. R. and Hare, R. D. (1988) 'Factor Structure of the Psychopathy Checklist', *Journal of Consulting and Clinical Psychology*, 56(5), pp. 741-747.
- He, Z., Ghose, B., Yaya, S., Cheng, Z. and Zhou, Y. (2020) 'Perceived neighborhood safety and exercise behavior among community dwellers in Gauteng, South Africa', *Medicine*, 99(51).
- Heaton, J. (1998) 'Secondary analysis of qualitative data', *Social Research Update*, 22(4), pp. 88-93.
- Heilmann, A. (2013) *Neighbourhoods and children's social and cognitive development—pathways of effects*. PhD thesis, University College London.
- Heitgerd, J. L. and Bursik, R. J. (1987) 'Extracommunity dynamics and the ecology of delinquency', *American Journal of Sociology*, 92(4), pp. 775-787.
- Hendrick, H. (2002) 'Constructions and reconstructions of British childhood: an interpretative survey, 1800 to the present', in Muncie, J., Hughes, G. & McLaughlin, E. (eds.) *Youth justice: Critical readings*. London: Sage Publications Ltd, pp.22-44.
- Hendrick, H. (2015) 'Histories of youth crime and justice', in Goldson, B. & Muncie, J. (eds.) *Youth crime and justice*. 2nd ed. London: Sage Publications Ltd, pp.3-16.
- Henry, B., Moffitt, T., Robins, L., Earls, F. and Silva, P. (1993) 'Early family predictors of child and adolescent antisocial behaviour: who are the mothers of delinquents?', *Criminal Behaviour and Mental Health*, 3(2), pp. 97-118.
- Henry, D. B., Tolan, P. H. and Gorman-Smith, D. (2001) 'Longitudinal family and peer group effects on violence and nonviolent delinquency', *Journal of Clinical Child Psychology*, 30(2), pp. 172-186.
- Herrenkohl, T. I., Maguin, E., Hill, K. G., Hawkins, J. D., Abbott, R. D. and Catalano, R. F. (2000) 'Developmental risk factors for youth violence', *Journal of Adolescent Health*, 26(3), pp. 176-186.
- Hill, J. and Wright, G. (2003) 'Youth, community safety and the paradox of inclusion', *The Howard Journal of Criminal Justice*, 42(3), pp. 282-297.

- Hill, R. (1949) *Families under stress: Adjustment to the crisis of war separation and reunion*. New York: Harper and Brothers.
- Hindelang, M. J., Hirschi, T. and Weis, J. G. (1979) 'Correlates of delinquency: The illusion of discrepancy between self-report and official measures', *American Sociological Review*, pp. 995-1014.
- Hipp, J. R. and Wo, J. C. (2015) 'Collective efficacy and crime', *International Encyclopedia of the Social & Behavioral Sciences*, 4, pp. 169-173.
- Hirschi, T. and Gottfredson, M. (1993) 'Commentary: Testing the general theory of crime', *Journal of Research in Crime and Delinquency*, 30(1), pp. 47-54.
- HM Government (2010) Our programme for government. In: Office, C. (ed.). London: Cabinet Office.
- HM Government. (2018) *Serious Violence Strategy*. Available at: <https://www.gov.uk/government/publications/> (accessed 17 February 2021).
- Hodgkinson, S. and Tilley, N. (2011) 'Tackling anti-social behaviour: Lessons from New Labour for the Coalition Government', *Criminology and Criminal Justice*, 11(4), pp. 283-305.
- Hoeve, M., Stams, G. J. J., van der Put, C. E., Dubas, J. S., van der Laan, P. H. and Gerris, J. R. (2012) 'A meta-analysis of attachment to parents and delinquency', *Journal of Abnormal Child Psychology*, 40(5), pp. 771-785.
- Hoge, R. D. (2009) 'Serious and violent juvenile offenders: Assessment and treatment', *Resource Material Series*, 78, pp. 49-56.
- Hollin, C. R. (2012) 'Criminological Psychology', in Maguire, M., Morgan, R. & Reiner, R. (eds.) *The Oxford handbook of criminology*. 5th ed. Oxford: Oxford University Press, pp.81-112.
- Home Office (2003) Respect and responsibility: Taking a stand against anti-Social behaviour. In: Office, T. S. (ed.). London: The Station Office.
- Home Office (2004) Defining and measuring anti-social behaviour. In: Office, H. (ed.). London: Home Office.
- Home Office (2014) Anti-social Behaviour, Crime and Policing Act 2014: Reform of anti-social behaviour powers Statutory guidance for frontline professionals. In: Office, H. (ed.). London: Home Office.
- Horne, C. (2004) 'Collective benefits, exchange interests, and norm enforcement', *Social Forces*, 82(3), pp. 1037-1062.
- Hough, J. and Roberts, J. V. (2004) *Youth crime and youth justice: Public opinion in England and Wales*. Bristol: Policy Press.
- Howard Association (1898) Juvenile offenders. A report based on an inquiry instituted by the committee of the Howard association. London: Howard Association.
- Hox, J. J. (2010) *Multilevel analysis: Techniques and applications*. Sussex: Routledge.
- Hox, J. J., Moerbeek, M. and Schoot, R. v. d. (2017) *Multilevel analysis: Techniques and applications*. New York: Routledge.
- Huaqing Qi, C. and Kaiser, A. P. (2003) 'Behavior problems of preschool children from low-income families: Review of the literature', *Topics in Early Childhood Special Education*, 23(4), pp. 188-216.
- Hubble, K. (2015) *Antisocial behaviour in adolescents: Exploring and improving emotion processing deficits*. Cardiff University.
- Hughes, G., Cooper, C., Gormally, S. and Rippingale, J. (2014) 'The state of youth work in austerity England – reclaiming the ability to ‘care’', *Youth & Policy*, 113, pp. 1-14.
- Hyde, L. W., Burt, S. A., Shaw, D. S., Donnellan, M. B. and Forbes, E. E. (2015) 'Early starting, aggressive, and/or callous–unemotional? Examining the overlap and predictive utility of antisocial behavior subtypes', *Journal of Abnormal Psychology*, 124(2), pp. 329.
- Ingoldsby, E. M. and Shaw, D. S. (2002) 'Neighborhood contextual factors and early-starting antisocial pathways', *Clinical Child and Family Psychology Review*, 5(1), pp. 21-55.
- Ingoldsby, E. M., Shaw, D. S., Winslow, E., Schonberg, M., Gilliom, M. and Criss, M. M. (2006) 'Neighborhood Disadvantage, Parent-Child Conflict, Neighborhood Peer Relationships, and

- Early Antisocial Behavior Problem Trajectories', *Journal of Abnormal Child Psychology*, 34(3), pp. 303-319.
- Ipsos MORI (2016) Millennium Cohort Study Sixth Sweep Technical Report. London: Ipsos MORI Social Research Institute.
- Irwin-Rogers, K., de-Lappe, J. and Phoenix, J. (2020) 'Antisocial shifts in social policy and serious violence between young people: Evidence from the cross-party youth violence commission', *British Journal of Community Justice*, 16(2), pp. 4-27.
- Jacobs, L. A., Ashcraft, L. E., Sewall, C. J., Folb, B. L. and Mair, C. (2020) 'Ecologies of juvenile reoffending: a systematic review of risk factors', *Journal of Criminal Justice*, 66, pp. 101638.
- Jacobson, K. C., Prescott, C. A. and Kendler, K. S. (2002) 'Sex differences in the genetic and environmental influences on the development of antisocial behavior', *Development and Psychopathology*, 14(2), pp. 395-416.
- Jaffee, S. R., Strait, L. B. and Odgers, C. L. (2012) 'From correlates to causes: Can quasi-experimental studies and statistical innovations bring us closer to identifying the causes of antisocial behavior?', *Psychological Bulletin*, 138(2), pp. 272-295.
- Jaynes, S. (2014) 'Using social disorganization theory to guide substance abuse prevention among adolescents: Implications for Educators', *The Journal of At-risk Issues*, 18(1), pp. 35-40.
- Jencks, C. and Mayer, S. E. (1990) 'The social consequences of growing up in a poor neighborhood', in Council, N. R. (ed.) *Inner-city poverty in the United States*. Washington, D.C: National Academies Press, pp.111-186.
- Jenks, C. (2005) *Childhood*. Oxon: Routledge.
- Jerrom, C. (2007) *Youth justice and the youth justice board*. Community Care. Available at: <http://www.communitycare.co.uk/2007/06/04/youth-justice-and-the-youth-justice-board/> (accessed 05 Jan 2017).
- Jewkes, Y. (2015) *Media and crime*. London: Sage Publications.
- Johns, D. F., Williams, K. and Haines, K. (2017) 'Ecological youth justice: Understanding the social ecology of young people's prolific offending', *Youth Justice*, 17(1), pp. 3-21.
- Johnson, J. (2015) Millennium Cohort Study: Psychological, developmental and health inventories. *CLS User Guide to the Data*. Centre for Longitudinal studies, Institute of Education.
- Johnson, R. E. (1980) 'Social Class and Delinquent Behavior: A New Test', *Criminology*, 18(1), pp. 86-93.
- Johnston, L. D., O'Malley, P. M. and Bachman, J. G. (1993) *National survey results on drug use from the Monitoring the Future study, 1975-1992. Volume I: Secondary school students*. Maryland: National Institute on Drug Use.
- Johnstone, C. (2016) 'After the Asbo: Extending control over young people's use of public space in England and Wales', *Critical Social Policy*, 36(4), pp. 716-726.
- Jolliffe, D. and Farrington, D. P. (2007) 'Examining the relationship between low empathy and self-reported offending', *Legal and Criminological Psychology*, 12(2), pp. 265-286.
- Jones, T. (2012) 'Public opinion, politics and the response to youth crime', in Smith, D. J. (ed.) *A new response to youth crime*. 2nd ed. Abingdon: Routledge, pp.341-379.
- Jupp, E. (2020) 'The time-spaces of austerity urbanism: Narratives of 'localism' and UK neighbourhood policy', *Urban Studies*, pp. 1-16.
- Kalff, A., Kroes, M., Vles, J., Hendriksen, J., Feron, F. J., Steyaert, J., Van Zeven, T., Jolles, J. and van Os, J. (2001) 'Neighbourhood level and individual level SES effects on child problem behaviour: a multilevel analysis', *Journal of Epidemiology & Community Health*, 55(4), pp. 246-250.
- Kaukinen, C. and Apel, R. (2017) 'The Effect of Variation in Intact Family Forms on Deviant and Antisocial Behavior', *American Journal of Criminal Justice*, 42(2), pp. 350-372.
- Kawachi, I., Kennedy, B. P. and Glass, R. (1999) 'Social capital and self-rated health: A contextual analysis', *American Journal of Public Health*, 89(8), pp. 1187-1193.
- Kelly, L. and Armitage, V. (2015) 'Diverse diversions: youth justice reform, localized practices, and a 'new interventionist diversion'?', *Youth Justice*, 15(2), pp. 117-133.

- Kierkus, C. A. and Baer, D. (2002) 'A social control explanation of the relationship between family structure and delinquent behaviour', *Canadian J. Criminology*, 44(4), pp. 425-458.
- Kim, J. (2004) *Neighbourhood effects on the etiology of child maltreatment: A multilevel study*. PhD thesis, The University of Texas at Austin.
- Kohen, D. E., Leventhal, T., Dahinten, V. S. and McIntosh, C. N. (2008) 'Neighborhood Disadvantage: Pathways of Effects for Young Children', *Child Development*, 79(1), pp. 156-169.
- Kreft, I. and Leeuw, J. D. (1998) *Introducing multilevel modeling*. CA: Sage.
- Kubrin, C. E. and Wo, J. C. (2016) 'Social disorganization theory's greatest challenge: Linking structural characteristics to crime in socially disorganized communities', in Piquero, A. R. (ed.) *The handbook of criminological theory*. New Jersey: John Wiley & Sons, Inc, pp.121-136.
- Kwan, M.-P. (2018) 'The neighborhood effect averaging problem (NEAP): An elusive confounder of the neighborhood effect', *International Journal of Environmental Research and Public Health*, 15(9), pp. 1-4.
- Lacey, L. M. I. (2012) *Youth Justice in England and Wales: Exploring young offenders' perceptions of restorative and procedural justice in the referral order process*. London School of Economics and Political Science.
- Lambert, D. (1992) 'Zero-inflated Poisson regression, with an application to defects in manufacturing', *Technometrics*, 34(1), pp. 1-14.
- Le Blanc, M. (1994) 'Family, school, delinquency and criminality, the predictive power of an elaborated social control theory for males', *Criminal Behaviour and Mental Health*, 4(2), pp. 101-117.
- Le Blanc, M., Vallières, E. and McDuff, P. (1992) 'Adolescents' school experience and self-reported offending: An empirical elaboration of an interactional and developmental school social control theory', *International Journal of Adolescence and Youth*, 3(3-4), pp. 197-247.
- Lea, J. (2015) 'Jock Young and the development of left realist criminology', *Critical Criminology*, 23(2), pp. 165-177.
- Leckie, G. (2009) 'The complexity of school and neighbourhood effects and movements of pupils on school differences in models of educational achievement', *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 172(3), pp. 537-554.
- Lenzi, M., Vieno, A., Perkins, D. D., Pastore, M., Santinello, M. and Mazzardis, S. (2012) 'Perceived neighborhood social resources as determinants of prosocial behavior in early adolescence', *American Journal of Community Psychology*, 50(1-2), pp. 37-49.
- Leventhal, T. and Brooks-Gunn, J. (2000) 'The neighborhoods they live in: the effects of neighborhood residence on child and adolescent outcomes', *Psychological bulletin*, 126(2), pp. 309-337.
- Leventhal, T., Dupéré, V. and Brooks-Gunn, J. (2009) 'Neighborhood influences on adolescent development', in Steinberg, L. & Lerner, R. (eds.) *Handbook of adolescent psychology*. New York: John Wiley, pp.411-443.
- Leveson, B. L. (2012) *An Inquiry into the Culture, Practices and Ethics of the Press: Executive Summary*. In: Government, H. M. (ed.). London: The Stationery Office.
- Lewis, S., Crawford, A. and Traynor, P. (2016) 'Nipping Crime in the Bud? The Use of Antisocial Behaviour Interventions with Young People in England and Wales', *British Journal of Criminology*, 57(5), pp. 1230-1248.
- Li, C. (2013) 'Little's test of missing completely at random', *The Stata Journal*, 13(4), pp. 795-809.
- Liljeberg, J. F., Eklund, J. M., Fritz, M. V. and af Klinteberg, B. (2011) 'Poor school bonding and delinquency over time: Bidirectional effects and sex differences', *Journal of Adolescence*, 34(1), pp. 1-9.
- Lilly, J. R. and Ball, R. A. (1995) *Criminological theory: Context and consequences*. Thousand Oaks,: Sage.
- Lindsey, C. and Sheather, S. (2010) 'Variable selection in linear regression', *The Stata Journal*, 10(4), pp. 650-669.
- Lipsey, M. W. and Derzon, J. H. (1998) 'Predictors of violent or serious delinquency in adolescence and early adulthood: a synthesis of longitudinal research', in Loeber, R. & Farrington, D. P. (eds.)

- Serious and violent juvenile offenders: Risk factors and successful interventions.* Thousand Oaks, CA: Sage,
- Little, R. J. (1995) 'Modeling the drop-out mechanism in repeated-measures studies', *Journal of the American Statistical Association*, 90(431), pp. 1112-1121.
- Loeber, R., Farrington, D. P., Stouthamer-Loeber, M. and Van Kammen, W. B. (1998) *Antisocial behavior and mental health problems: Explanatory factors in childhood and adolescence.* Psychology Press.
- Loeber, R., Green, S. M., Keenan, K. and Lahey, B. B. (1995) 'Which boys will fare worse? Early predictors of the onset of conduct disorder in a six-year longitudinal study', *Journal of the American Academy of Child & Adolescent Psychiatry*, 34(4), pp. 499-509.
- Loeber, R. and Wikstrom, P. (1993) 'Individual pathways to crime in different types of neighborhoods', in Farrington, D. P., Sampson, R. J. & Wikström, P.-O. H. (eds.) *Integrating individual and ecological aspects of crime.* Stockholm, Sweden: National Council on Crime Prevention, pp.169-204.
- Lorber, M. F. and Slep, A. M. S. (2015) 'Are persistent early onset child conduct problems predicted by the trajectories and initial levels of discipline practices?', *Developmental Psychology*, 51(8), pp. 1048-1061.
- Lubke, G. H., McArtor, D. B., Boomsma, D. I. and Bartels, M. (2018) 'Genetic and environmental contributions to the development of childhood aggression', *Developmental Psychology*, 54(1), pp. 39-50.
- Ludwig, J., Duncan, G. J. and Hirschfield, P. (2001) 'Urban poverty and juvenile crime: Evidence from a randomized housing-mobility experiment', *The Quarterly Journal of Economics*, 116(2), pp. 655-679.
- Lupton, R. (2001) *Places apart?: The initial report of CASE's areas study.* London: London School of Economics and Political Science.
- Lupton, R. (2003) *Neighbourhood effects: Can we measure them and does it matter?* London: Centre for Analysis of Social Exclusion
- Lupton, R. and Kneale, D. (2012) 'Theorising and measuring place in neighbourhood effects research: The example of teenage parenthood in England', in Ham, M., Manley, D., Bailey, N., Soimpson, L. & Maclennan, D. (eds.) *Neighbourhood effects research: New perspectives.* Dordrecht: Springer, pp.121-145.
- Lupton, R. and Power, A. (2005) 'Disadvantaged by where you live? New Labour and neighbourhood renewal', in Hills, J. & Stewart, K. (eds.) *A more equal society?* Bristol: The Policy Press,
- Maggi, S. (2010) 'The social determinants of early child development: An overview', *Journal of Paediatrics and Child Health*, 46(11), pp. 627-635.
- Maimon, D. and Browning, C. R. (2010) 'Unstructured socializing, collective efficacy, and violent behavior among urban youth', *Criminology*, 48(2), pp. 443-474.
- Malia, J. A. (2006) 'Basic concepts and models of family stress', *Stress, Trauma, and Crisis*, 9(3-4), pp. 141-160.
- Manning, W. D., Smock, P. J. and Majumdar, D. (2004) 'The relative stability of cohabiting and marital unions for children', *Population Research and Policy Review*, 23(2), pp. 135-159.
- Martens, W. H. (2000) 'Antisocial and psychopathic personality disorders: Causes, course, and remission—A review article', *International Journal of Offender Therapy and Comparative Criminology*, 44(4), pp. 406-430.
- Martin, G. C. (2019) *The neighbourhood social environment and its role in adolescent alcohol use and drinking motives.* University of St Andrews.
- Mason, A. W., Hitch, J. E., Kosterman, R., McCarty, C. A., Herrenkohl, T. I. and Hawkins, D. J. (2010) 'Growth in adolescent delinquency and alcohol use in relation to young adult crime, alcohol use disorders, and risky sex: a comparison of youth from low - versus middle - income backgrounds', *Journal of Child Psychology and Psychiatry*, 51(12), pp. 1377-1385.

- Mason, W. (2015) 'Austerity youth policy: exploring the distinctions between youth work in principle and youth work in practice', *Youth and Policy*, 114, pp. 55-74.
- Mason, W. A., Hitchings, J. E. and Spoth, R. L. (2007) 'Emergence of delinquency and depressed mood throughout adolescence as predictors of late adolescent problem substance use', *Psychology of Addictive Behaviors*, 21(1), pp. 13-24.
- Matthews, R., Easton, H., Briggs, D. and Pease, K. (2007) *Assessing the use and impact of anti-social behaviour orders*. Bristol: Policy Press.
- Mayer, S. E. and Jencks, C. (1989) 'Growing up in poor neighborhoods: How much does it matter?', *Science*, 243(4897), pp. 1441-1446.
- Mazerolle, L., Wickes, R. and McBroom, J. (2010) 'Community variations in violence: The role of social ties and collective efficacy in comparative context', *Journal of Research in Crime and Delinquency*, 47(1), pp. 3-30.
- Mazza, J. R. S., Lambert, J., Zunzunegui, M. V., Tremblay, R. E., Boivin, M. and Côté, S. M. (2017) 'Early adolescence behavior problems and timing of poverty during childhood: A comparison of lifecourse models', *Social Science & Medicine*, 177, pp. 35-42.
- McAnulla, S. (2007) 'New Labour, old epistemology? Reflections on political science, new institutionalism and the Blair government', *Parliamentary Affairs*, 60(2), pp. 313-313.
- McAra, L. and McVie, S. (2007) 'Youth justice? The impact of system contact on patterns of desistance from offending', *European Journal of Criminology*, 4(3), pp. 315-345.
- McAra, L. and McVie, S. (2010) 'Youth crime and justice: Key messages from the Edinburgh Study of Youth Transitions and Crime', *Criminology & Criminal Justice*, 10(2), pp. 179-209.
- McAtamney, A. and Morgan, A. (2009) *Key issues in antisocial behaviour*. Canberra: Australian Institute of Criminology.
- McCulloch, A. and Joshi, H. E. (2000) *Neighbourhood and family influences on the cognitive ability of children in the British National Child Development Study*. University of Essex; Institute for Social and Economic Research.
- McDermott, J. (1983) 'Serious Juvenile Offender: Problems in Definition and Targeting', in Kluegel, J. R. (ed.) *Evaluating juvenile justice*. Sage Publications; American Society of Criminology, pp.37-90.
- McGee, T. R., Wickes, R., Corcoran, J., Bor, W. and Najman, J. (2011) 'Antisocial behaviour: An examination of individual, family, and neighbourhood factors', *Trends and Issues in Crime and Criminal Justice*, (410), pp. 1-6.
- McGue, M. and Iacono, W. (2005) 'The association of early adolescent problem behavior with adult psychopathology', *The American journal of psychiatry*, 162(6), pp. 1118-1124.
- McKnight, L. R. and Loper, A. B. (2002) 'The effect of risk and resilience factors on the prediction of delinquency in adolescent girls', *School Psychology International*, 23(2), pp. 186-198.
- McLanahan, S. and Sandefur, G. (1994) *Growing Up with a Single Parent. What Hurts, What Helps*. Cambridge, MA: Harvard University Press.
- McLaren, L. and Hawe, P. (2005) 'Ecological perspectives in health research', *Journal of Epidemiology & Community Health*, 59(1), pp. 6-14.
- McLeod, J. D., Kruttschnitt, C. and Dornfeld, M. (1994) 'Does Parenting Explain the Effects of Structural Conditions on Children's Antisocial Behavior-A Comparison of Blacks and Whites', *Social Forces*, 73(2), pp. 575-604.
- McVie, S. and Norris, P. (2006) *Neighbourhood Effects on Youth Delinquency and Drug Use*. Centre for Law and Society, University of Edinburgh.
- Merrin, G. J., Davis, J. P., Ingram, K. M. and Espelage, D. L. (2020) 'Examining social-ecological correlates of youth gang entry among serious juvenile offenders: A survival analysis', *American Journal of Orthopsychiatry*, 90(5), pp. 623-632.
- Middleton, F. (2019a) *The four types of validity*. Scribbr. Available at: <https://www.scribbr.com/methodology/types-of-validity/> (accessed 10 April 2021).

- Middleton, F. (2019b) *Reliability vs validity: what's the difference?* : Scribbr. Available at: <https://www.scribbr.com/methodology/reliability-vs-validity/> (accessed 10 April 2021).
- Miles, D. R. and Carey, G. (1997) 'Genetic and environmental architecture on human aggression', *Journal of Personality and Social Psychology*, 72(1), pp. 207-217.
- Millie, A. (2008) 'Anti-social behaviour, behavioural expectations and an urban aesthetic', *British Journal of Criminology*, 48(3), pp. 379-394.
- Millie, A., Jacobson, J. and McDonald, E. (2005) *Anti-social behaviour strategies: Finding a balance*. Bristol: Policy Press.
- Ministry of Justice (2010) *Breaking the cycle: Effective punishment, rehabilitation and sentencing of offenders*. London: The Stationery Office Ltd.
- Ministry of Justice (2011) *Anti-social behaviour order statistics: England and Wales 2009*. Ministry of Justice.
- Ministry of Justice (2012) *Statistical bulletin on the public disorder of 6th to 9th August 2011*. In: Justice, M. o. (ed.). London: Ministry of Justice.
- Ministry of Justice (2013) *Criminal Justice Statistics - Quarterly Update to December 2012: England and Wales - Supplementary tables*. London: Ministry of Justice.
- Moffitt, T. E. (1993) 'Adolescence-limited and life-course-persistent antisocial behavior: a developmental taxonomy', *Psychological Review*, 100(4), pp. 674-701.
- Moffitt, T. E. (2001) *Sex differences in antisocial behaviour: Conduct disorder, delinquency, and violence in the Dunedin Longitudinal Study*. Cambridge: Cambridge University Press.
- Moffitt, T. E. (2005a) 'Genetic and environmental influences on antisocial behaviors: Evidence from behavioral-genetic research', *Advances in Genetics*, 55, pp. 41-104.
- Moffitt, T. E. (2005b) 'The new look of behavioral genetics in developmental psychopathology: gene-environment interplay in antisocial behaviors', *Psychological Bulletin*, 131(4), pp. 533.
- Moffitt, T. E. (2006) 'Life-course-persistent versus adolescence-limited antisocial behavior', in Cicchetti, D. & Cohen, D. J. (eds.) *Developmental psychopathology: Risk, disorder, and adaptation*. New Jersey: John Wiley & Sons Inc, pp.570-598.
- Moffitt, T. E. (2018) 'Male antisocial behaviour in adolescence and beyond', *Nature Human Behaviour*, 2(3), pp. 177-186.
- Moffitt, T. E. and Caspi, A. (2001) 'Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females', *Development and Psychopathology*, 13(2), pp. 355-375.
- Moffitt, T. E., Lynam, D. R. and Silva, P. A. (1994) 'Neuropsychological tests predicting persistent male delinquency', *Criminology*, 32(2), pp. 277-300.
- Molnar, B., Cerda, M., Roberts, A. and Buka, S. (2008) 'Effects of neighborhood resources on aggressive and delinquent behaviors among urban youths', *American Journal of Public Health*, 98(6), pp. 1086-1093.
- Morenoff, J. D., Sampson, R. J. and Raudenbush, S. W. (2001) 'Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence', *Criminology*, 39(3), pp. 517-558.
- Morgan Harris Burrows (2003) *Evaluation of the Youth Inclusion Programme*. London: MHB.
- Morgan, J. (2007) *Parenting and its contexts: The impact on childhood antisocial behaviour*. London School of Economics and Political Science.
- Morgan, J. E. (2012) *Antisocial behaviour in adolescence: The role of reward processing*. Cardiff University.
- Morgan, R. and Newburn, T. (2007) 'Youth justice', in Maguire, M., Morgan, R. & Reiner, R. (eds.) *The oxford handbook of criminology*. 4th ed. Oxfore: Oxford University Press,
- MORI (2005) *Young people and the media*. Young People Now Magazine.
- Morizot, J. and Kazemian, L. (2015) 'Understanding criminal and antisocial behavior within a developmental and multidisciplinary perspective', in Morizot, J. & Kazemian, L. (eds.) *The development of criminal and antisocial behavior*. London: Springer, pp.1-16.
- Morris, L. (1994) *Dangerous classes: The underclass and social citizenship*. London: Routledge.

- Mostafa, T. and Ploubidis, G. (2017) Millennium Cohort Study Sixth Survey 2015-2016 Technical Report on Response. London: Centre for Longitudinal Studies.
- Mueller, R. O. and Hancock, G. R. (2018) 'Structural equation modeling', in Hancock, G. R., Stapleton, L. M. & Mueller, R. O. (eds.) *The reviewer's guide to quantitative methods in the social sciences*. Routledge, pp.445-456.
- Mullan, K. (2012) School's out—After-school's in: Children's after-school care arrangements and activities. In: Studies, A. I. o. F. (ed.) *The Longitudinal Study of Australian Children Annual statistical report 2012*. Australian Institute of Family Studies.
- Muncie, J. (1984) *The Trouble with Kids Today: Youth and Crime in Post-war Britain*. London: Hutchinson.
- Muncie, J. (1999) 'Institutionalized intolerance: youth justice and the 1998 Crime and Disorder Act', *Critical Social Policy*, 19(2), pp. 147-175.
- Muncie, J. (2004) *Youth & Crime*. London: Sage.
- Muncie, J. (2005) 'The globalization of crime control - the case of youth and juvenile justice: Neo-liberalism, policy convergence and international conventions', *Theoretical Criminology*, 9(1), pp. 35-64.
- Muncie, J. (2009) *Youth & Crime*. London: Sage Publications Ltd.
- Muncie, J. (2015) *Youth & crime*. London: Sage Publications Ltd.
- Murji, K. and Neal, S. (2011) 'Riot: Race and politics in the 2011 disorders', *Sociological Research Online*, 16(4), pp. 216-220.
- Murray, J. and Farrington, D. P. (2010) 'Risk factors for conduct disorder and delinquency: key findings from longitudinal studies', *The Canadian Journal of Psychiatry*, 55(10), pp. 633-642.
- Nacro (2008) *Some facts about children and young people who offend - 2006*. London: Nacro.
- Neppl, T. K., Senia, J. M. and Donnellan, M. B. (2016) 'Effects of economic hardship: Testing the family stress model over time', *Journal of Family Psychology*, 30(1), pp. 12.
- Neustatter, A. (1998) 'Kids-what the papers say'. *Guardian*, 4 April.
- Newburn, T. (1996) 'Back to the future? Youth crime, youth justice and the rediscovery of 'authoritarian populism'', in Pilcher, J. & Wagg, S. (eds.) *Thatcher's Children?: Politics, Childhood and Society in the 1980s and 1990s*. London: Routledge Falmer,
- Newburn, T. (2007) 'Youth crime and youth culture', in Maguire, M., Morgan, R. & Reiner, R. (eds.) 4th ed. Oxford: Oxford University Press,
- Newburn, T. (2012) 'Counterblast: Young People and the August 2011 Riots', *The Howard Journal of Criminal Justice*, 51(3), pp. 331-335.
- NHS Data Model and Dictionary. (2019) *Lower Layer Super Output Area*. Available at: https://datadictionary.nhs.uk/nhs_business_definitions/lower_layer_super_output_area.html (accessed 15 June 2019).
- Nixon, J., Blady, S., Hunter, C. and Reeve, K. (2003) Tackling anti-social behaviour in mixed tenure areas. In: Minister, O. o. t. D. P. (ed.). London: Office of the Deputy Prime Minister Publications.
- NYA (2014) Youth Services in England: Changes and Trends in the Provision of Services. Leicester: National Youth Agency; Network of Regional Youth Work Units England
- Oberwittler, D. (2004) 'A multilevel analysis of neighbourhood contextual effects on serious juvenile offending: The role of subcultural values and social disorganization', *European journal of criminology*, 1(2), pp. 201-235.
- Odgers, C. L., Caspi, A., Russell, M. A., Sampson, R. J., Arseneault, L. and Moffitt, T. E. (2012) 'Supportive parenting mediates neighborhood socioeconomic disparities in children's antisocial behavior from ages 5 to 12', *Development and Psychopathology*, 24(3), pp. 705-721.
- Odgers, C. L., Moffitt, T. E., Tach, L. M., Sampson, R. J., Taylor, A., Matthews, C. L. and Caspi, A. (2009) 'The protective effects of neighborhood collective efficacy on British children growing up in deprivation: a developmental analysis', *Developmental Psychology*, 45(4), pp. 942-957.

- Office for National Statistics (2005) Crime Survey for England and Wales: Estimates of personal and household crime, anti-social behaviour, and public perceptions by police force area. *In: Statistics, O. f. N. (ed.)*. London: Office for National Statistics.
- Office for National Statistics (2012) Changes to output areas and super output areas in England and Wales, 2001 to 2011. *In: Statistics, O. f. N. (ed.)*. London: Office for National Statistics.
- Office for National Statistics (2019) Crime Survey for England and Wales: Estimates of personal and household crime, anti-social behaviour, and public perceptions by police force area. *In: Statistics, O. f. N. (ed.)*. London: Office for National Statistics.
- Office for National Statistics, National Records of Scotland and Northern Ireland Statistics and Research Agency. (2017) *2011 Census aggregate data*. UK Data Service. Available at: <http://dx.doi.org/10.5257/census/aggregate-2011-2> (accessed 25 October 2019).
- Ojo, A., Evans, R. and Karecha, J. (2017) *Repercussions of the Coalition Governments Austerity Policy on Community Safety across Merseyside*. Oxford: Oxford University Press.
- Oliver, L. N., Dunn, J. R., Kohen, D. E. and Hertzman, C. (2007) 'Do neighbourhoods influence the readiness to learn of kindergarten children in Vancouver? A multilevel analysis of neighbourhood effects', *Environment and Planning A*, 39(4), pp. 848-868.
- Pakiz, B., Reinherz, H. Z. and Giaconia, R. M. (1997) 'Early risk factors for serious antisocial behavior at age 21: A longitudinal community study', *American Journal of Orthopsychiatry*, 67(1), pp. 92-101.
- Pardini, D. A., Waller, R. and Hawes, S. W. (2015) 'Familial Influences on the Development of Serious Conduct Problems and Delinquency', in Morizot, J. & Kazemian, L. (eds.) *The development of criminal and antisocial behavior*. London: Springer, pp.201-220.
- Park, R. E., Burgess, E. and McKenzie, R. (1925) *The city*. Chicago: The University of Chicago Press.
- Parker, R. N. and Auerhahn, K. (1998) 'Alcohol, drugs, and violence', *Annual review of sociology*, 24(1), pp. 291-311.
- Parr, S. and Nixon, J. (2008) 'Rationalising family intervention projects', in Squires, P. (ed.) *ASBO Nation: The criminalisation of nuisance*. Bristol: The Policy Press, pp.161-177.
- Pauwels, L. J., Weerman, F. M., Bruinsma, G. J. and Bernasco, W. (2015) 'How much variance in offending, self-control and morality can be explained by neighbourhoods and schools? An exploratory cross-classified multi-level analysis', *European Journal on Criminal Policy and Research*, 21(4), pp. 523-537.
- Pearson, G. (1983) *Hooligan: A History of Respectable Fears*. London: The Macmillan Press Ltd.
- Peeples, F. and Loeber, R. (1994) 'Do individual factors and neighborhood context explain ethnic differences in juvenile delinquency?', *Journal of Quantitative Criminology*, 10(2), pp. 141-157.
- Pettit, G. S., Bates, J. E. and Dodge, K. A. (1997) 'Supportive parenting, Ecological Context, and Children's Adjustment: A seven-Year Longitudinal Study', *Child Development*, 68(5), pp. 908-923.
- Pettit, G. S., Bates, J. E., Dodge, K. A. and Meece, D. W. (1999) 'The impact of after-school peer contact on early adolescent externalizing problems is moderated by parental monitoring, perceived neighborhood safety, and prior adjustment', *Child Development*, 70(3), pp. 768-778.
- Phillips, A. and Chamberlain, V. (2006) *MORI Five Year Report: An analysis of youth survey data*. London: Youth Justice Board.
- Pike, A., Mcguire, S., Hetherington, E. M., Reiss, D. and Plomin, R. (1996) 'Family Environment and Adolescent Depressive Symptoms and Antisocial Behavior', *Developmental Psychology*, 32(4), pp. 590-603.
- Piotrowska, P. J., Stride, C. B., Croft, S. E. and Rowe, R. (2015) 'Socioeconomic status and antisocial behaviour among children and adolescents: A systematic review and meta-analysis', *Clinical Psychology Review*, 35, pp. 47-55.
- Piotrowska, P. J., Stride, C. B., Maughan, B. and Rowe, R. (2019) 'Mechanisms underlying social gradients in child and adolescent antisocial behaviour', *SSM-Population Health*, 7, pp. 1-8.

- Piotrowska, P. J., Stride, C. B. and Rowe, R. (2012) 'Social gradients in child and adolescent antisocial behavior: A systematic review protocol', *Systematic Reviews*, 1(38), pp. 1-6.
- Piza, E. L. (2012) *Using Poisson and negative binomial regression models to measure the influence of risk on crime incident counts*. Newark: Center on Public Security.
- Ponsford, R., Thompson, C. and Papparini, S. (2019) 'We need a renewed focus on primary prevention to tackle youth knife violence', *BMJ*, 365(1), pp. 1-2.
- Poore, H. E. and Waldman, I. D. (2020) 'The association of oxytocin receptor gene (OXTR) polymorphisms antisocial behavior: a meta-analysis', *Behavior Genetics*, 50(3), pp. 161-173.
- Pople, L. (2012) 'Responding to antisocial behaviour', in Smith, D. (ed.) *A New Response to Youth Crime*. Abingdon: Routledge, pp.143-79.
- Pratt, J. (2000) 'Emotive and ostentatious punishment: Its decline and resurgence in modern society', *Punishment & Society*, 2(4), pp. 417-439.
- Puffett, N. (2012) *Special Youth Work Roles Under Threat, Claims NYA*. 12 October 2012 ed.: Children and Young People Now.
- Putnam, R. D. (2000) *Bowling alone: The collapse and revival of American community*. London: Simon and Schuster.
- Raudenbush, S. W. and Bryk, A. S. (2002) *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks: Sage.
- Reid, J. B., Patterson, G. R. and Snyder, J. E. (2002) *Antisocial behavior in children and adolescents: A developmental analysis and model for intervention*. Washington, DC: American Psychological Association.
- Reiner, R. (2007) 'Media made criminality: The representation of crime in the mass media', in Maguire, M., Morgan, R. & Reiner, R. (eds.) *The oxford handbook of criminology*. Oxford: Oxford University Press,
- Rhee, S. and Waldman, I. (2002) 'Genetic and environmental influences on antisocial behavior: a meta-analysis of twin and adoption studies', *Psychological Bulletin*, (128), pp. 490-529.
- Rice, T. M. and Sumberg, A. F. (1997) 'Civic culture and government performance in the American states', *Publius: The Journal of Federalism*, 27(1), pp. 99-114.
- Roberts, J. and Hough, M. (2002) 'Public Attitudes to Punishment: The context', in Roberts, J. V. & Hough, M. (eds.) *Changing attitudes to punishment: Public opinion*. London: Routledge,
- Roberts, J. V. (2004) 'Public opinion and youth justice', *Crime and Justice*, 31, pp. 495-542.
- Roberts, R. (Year) Published. *Criminal justice in times of austerity. the Defend the Right to Protest Seminar*, 2015.
- Rogan, A. (2021) 'The Demonisation of Delinquency: Contesting Media Reporting and Political Rhetoric on Youth Crime in the United Kingdom and Addressing Academia's Social Responsibility to Engage', *International Modern Perspectives on Academia and Community Today*, pp. 1-6.
- Romero, E., Luengo, M. A. and Sobral, J. (2001) 'Personality and antisocial behaviour: Study of temperamental dimensions', *Personality and individual differences*, 31(3), pp. 329-348.
- Rose, N. (1990) *Governing the soul: The shaping of the private self*. London: Routledge.
- Rossow, I., Pape, H. and Wichstrom, L. (1999) 'Young, wet & wild? Associations between alcohol intoxication and violent behaviour in adolescence', *Addiction*, 94(7), pp. 1017-1031.
- Rountree, P. W. and Warner, B. D. (1999) 'Social ties and crime: Is the relationship gendered?', *Criminology*, 37(4), pp. 789-814.
- Ruisch, I. H., Dietrich, A., Glennon, J. C., Buitelaar, J. K. and Hoekstra, P. J. (2019) 'Interplay between genome-wide implicated genetic variants and environmental factors related to childhood antisocial behavior in the UK ALSPAC cohort', *European Archives of Psychiatry and Clinical Neuroscience*, 269(6), pp. 741-752.
- Ruiz-Ortiz, R., Braza, P., Carreras, R. and Muñoz, J. M. (2017) 'Differential effects of mother's and father's parenting on prosocial and antisocial behavior: Child sex moderating', *Journal of Child and Family Studies*, 26(8), pp. 2182-2190.

- Rutter, M. (2012) 'Causes of offending and antisocial behaviour', in Smith, D. (ed.) *A new response to youth crime*. 2nd ed. Oxon: Routledge, pp.180-208.
- Rutter, M., Giller, H. and Hagell, A. (1998) *Antisocial behavior by young people*. Cambridge: Cambridge University Press.
- Sagan, A. (2013) 'Market research and preference data', in Scott, M. A., Simonoff, J. S. & Marx, B. D. (eds.) *The SAGE handbook of multilevel modeling*. 1st ed. London: Sage, pp.581-598.
- Saladino, V., Mosca, O., Lauriola, M., Hoelzlhammer, L., Cabras, C. and Verrastro, V. (2020) 'Is family structure associated with deviance propensity during adolescence? The role of family climate and anger dysregulation', *International Journal of Environmental Research and Public Health*, 17(24), pp. 9257.
- Sampson, R. J. (1994) 'Urban Poverty and the Family Context of Delinquency: A New Look at Structure and Process in a Classic Study', *Child Development*, 65(2), pp. 523-540.
- Sampson, R. J. (2006) 'How does community context matter? Social mechanisms and the explanation of crime rates', in Wikström, P. & Sampson, R. J. (eds.) *The explanation of crime: Context, mechanisms, and development*. New York: Cambridge University Press, pp.31-60.
- Sampson, R. J. (2012) *Great American city: Chicago and the enduring neighborhood effect*. Chicago: University of Chicago Press.
- Sampson, R. J. and Groves, W. B. (1989) 'Community structure and crime: Testing social-disorganization theory', *American Journal of Sociology*, pp. 774-802.
- Sampson, R. J., Morenoff, J. D. and Earls, F. (1999) 'Beyond social capital: Spatial dynamics of collective efficacy for children', *American sociological review*, pp. 633-660.
- Sampson, R. J., Morenoff, J. D. and Gannon-Rowley, T. (2002) 'Assessing "neighborhood effects": Social processes and new directions in research', *Annual review of sociology*, 28(1), pp. 443-478.
- Sampson, R. J. and Raudenbush, S. W. (1999) 'Systematic social observation of public spaces: A new look at disorder in urban Neighborhoods 1', *American Journal of Sociology*, 105(3), pp. 603-651.
- Sampson, R. J., Raudenbush, S. W. and Earls, F. (1997) 'Neighborhoods and violent crime: A multilevel study of collective efficacy', *Science*, 277(5328), pp. 918-924.
- Sampson, R. J. and Wikström, P.-O. (2008) 'The social order of violence in Chicago and Stockholm neighborhoods', in Kalyvas, S. N., Shapiro, I. & Masoud, T. (eds.) *Order, Conflict and Violence*. Cambridge: Cambridge University Press,
- Sawkins, J. W. (2002) 'Examination performance in Scottish secondary schools: an ordered logit approach', *Applied Economics*, 34(16), pp. 2031-2041.
- Scanlon, E. and Devine, K. (2001) 'Residential mobility and youth well-being: Research, policy, and practice issues', *J. Soc. & Soc. Welfare*, 28(1), pp. 119-138.
- Schmits, E. and Glowacz, F. (2019) 'Delinquency and drug use among adolescents and emerging adults: The role of aggression, impulsivity, empathy, and cognitive distortions', *Journal of Substance Use*, 24(2), pp. 162-169.
- Schneiders, J., Drukker, M., van der Ende, J., Verhulst, F., van Os, J. and Nicolson, N. (2003) 'Neighbourhood socioeconomic disadvantage and behavioural problems from late childhood into early adolescence', *Journal of Epidemiology & Community Health*, 57(9), pp. 699-703.
- Schoenmacker, G. H., Sakala, K., Franke, B., Buitelaar, J. K., Veidebaum, T., Harro, J., Heskes, T., Claassen, T. and Alejandro, A. V. (2020) 'Identification and validation of risk factors for antisocial behaviour involving police', *Psychiatry Research*, 291, pp. 1-9.
- Schoot, R. v. d., Velden, F. v. d., Boom, J. and Brugman, D. (2010) 'Can at-risk young adolescents be popular and anti-social? Sociometric status groups, anti-social behaviour, gender and ethnic background', *Journal of Adolescence*, 33(5), pp. 583-592.
- Schulenberg, J. L., Jacob, J. C. and Carrington, P. J. (2007) 'Ecological analysis of crime rates and police discretion with young persons: A replication', *Canadian Journal of Criminology and Criminal Justice*, 49(2), pp. 261-277.

- Sellström, E. and Bremberg, S. (2006) 'Review Article: The significance of neighbourhood context to child and adolescent health and well-being: A systematic review of multilevel studies', *Scandinavian Journal of Social Medicine*, 34(5), pp. 544-554.
- Shaw, C. and Mackay, H. (1942) *Juvenile delinquency and urban areas*. Chicago.
- Shaw, C. R. and McKay, H. D. (1969) *Juvenile delinquency and urban areas*. Chicago: The University of Chicago Press.
- Shaw, D., Dishion, T., Supplee, L., Gardner, F. and Arnds, K. (2006) 'A family-centered approach to the prevention of early-onset antisocial behavior: Two-year effects of the Family Check-Up in early childhood', *Journal of Consulting and Clinical Psychology*, 74, pp. 1-9.
- Simester, A. and von Hirsch, A. (2006) 'Regulating offensive conduct through two-step prohibitions', in Simester, A. & von Hirsch, A. (eds.) *Incivilities: Regulating offensive behaviour*. Oxford: Hart Publishing,
- Simons-Morton, B. G., Crump, A. D., Haynie, D. L. and Saylor, K. E. (1999) 'Student-school bonding and adolescent problem behavior', *Health Education Research*, 14(1), pp. 99-107.
- Skilling, T. A., Quinsey, V. L. and Craig, W. M. (2001) 'Evidence of a taxon underlying serious antisocial behavior in boys', *Criminal Justice and Behavior*, 28(4), pp. 450-470.
- Skinns, L. (2005) *Cops, councils and crime and disorder: A critical review of three community safety partnerships*. University of Cambridge.
- Slutske, W. S., Eisen, S., Xian, H., True, W. R., Lyons, M. J., Goldberg, J. and Tsuang, M. (2001) 'A twin study of the association between pathological gambling and antisocial personality disorder', *Journal of Abnormal Psychology*, 110(2), pp. 297.
- Smart, D., Vassallo, S., Sanson, A. and Dussuyer, I. (2004) *Patterns of antisocial behaviour from early to late adolescence*. Canberra: Australian Institute of Criminology.
- Smith, D. J. and Ecob, R. (2007) 'An investigation into causal links between victimization and offending in adolescents', *The British Journal of Sociology*, 58(4), pp. 633-659.
- Smith, G. (1999) *Area-based initiatives: The rationale and options for area targeting*. London: Centre for Analysis of Social Exclusion.
- Smith, J. A. and Osborn, M. (2003) 'Interpretative Phenomenological analysis: A practical guide to research method', in Smith, J. A. (ed.) *Qualitative Psychology*. London: Sage, pp.517-534.
- Smith, L. J. (2014a) *Investigating the differential role of cognitive and affective characteristics associated with depressive symptomatology and callous-unemotional traits in adolescents engaging in externalising and antisocial behaviours*. King's College London.
- Smith, R. (2014b) 'Reinventing diversion', *Youth Justice*, 14(2), pp. 109-121.
- Snell-Johns, J., Mendez, J. L. and Smith, B. H. (2004) 'Evidence-based solutions for overcoming access barriers, decreasing attrition, and promoting change with underserved families', *Journal of Family Psychology*, 18(1), pp. 19-35.
- Snijders, T. A. B. and Bosker, R. J. (2011) *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. London: Sage.
- Social Exclusion Unit (1998) *Bringing Britain together: A national strategy for neighbourhood renewal*. London: Social Exclusion Unit.
- Sommet, N. and Morselli, D. (2017) 'Keep calm and learn multilevel logistic modeling: A simplified three-step procedure using Stata, R, Mplus, and SPSS', *International Review of Social Psychology*, 30(1), pp. 203-218.
- Souhami, A. (2015) 'The central institutions of youth justice: Government bureaucracy and the importance of the youth justice board for England and Wales', *Youth Justice*, 15(3), pp. 209-225.
- Springhall, J. (1986) *Coming of age: Adolescence in Britain 1860-1960*. Dublin: Gill and Macmillan Ltd.
- Squires, P. (2006a) 'New Labour and the politics of antisocial behaviour', *Critical social policy*, 26(1), pp. 144-168.
- Squires, P. (2006b) *Rougher Justice: Anti-social Behaviour and Young People*. Devon: Willan Publishing.
- Squires, P. (2008) 'The Politics of anti-social behaviour', *British Politics*, 3(3), pp. 300-323.

- Stata Corp (2017) Stata Item Response Theory Reference Manual Release 15 Stata Corp.
- Stata Corp (2020) Zero-inflated Poisson regression. Stata Corp.
- Steele, F. (2008a) 'Introduction to Multilevel modelling concepts', in Modelling, C. f. M. (ed.) *LEMMA (Learning Environment for Multilevel Methodology and Applications)*. Bristol: University of Bristol, pp.1-45.
- Steele, F. (2008b) 'Single-level and Multilevel Models for Nominal Responses Concepts ', in Modelling, C. f. M. (ed.) *LEMMA (Learning Environment for Multilevel Methodology and Applications)*. Bristol: University of Bristol, pp.1-3.
- Steinberg, L. (2000) 'Youth Violence: Do Parents and Families Make a Difference?', *National Institute of Justice Journal*, 243, pp. 31-38.
- Stephenson, M., Giller, H. and Brown, S. (2011) *Effective practice in youth justice*. Oxon: Routledge.
- Stouthamer-Loeber, M., Drinkwater, M. and Loeber, R. (2000) 'Family functioning profiles, early onset of offending and disadvantaged neighbourhoods', *International Journal of Child and Family Welfare*, 4(3), pp. 247-256.
- Strohschein, L. and Gauthier, A. H. (2018) 'Poverty dynamics, parenting, and child mental health in Canada', *Society and Mental Health*, 8(3), pp. 231-247.
- Sullivan, C. J. (2014) 'Individual, social, and neighborhood influences on the launch of adolescent antisocial behavior', *Youth Violence and Juvenile Justice*, 12(2), pp. 103-120.
- Sutherland, A., Disley, E., Cattell, J. and Bauchowitz, S. (2017) An analysis of trends in first time entrants to the youth justice system. In: Justice, M. o. (ed.). London: Ministry of Justice.
- Syngelaki, E.-M. (2008) *Offending behaviour in antisocial youths: Psychological causes and practical implications*. Cardiff University.
- Tanner, J. M. (1968) 'Earlier maturation in man', *Scientific American*, 218(1), pp. 21-27.
- Taylor, C. (2016) Review of the Youth Justice System in England and Wales. In: Justice, M. o. (ed.). London.
- Taylor, R. B., Harris, P. W., Jones, P. R., Garcia, R. M. and McCord, E. S. (2011) 'Ecological origins of shared perceptions of troublesome teen groups: Implications for the basic systemic model of crime, the incivilities thesis, and political economy', *Journal of Research in Crime and Delinquency*, 48(2), pp. 298-324.
- The Independent. (2018) *The rise in youth knife crime should be treated as an emergency* The Independent. Available at: <https://www.independent.co.uk/voices/editorials/knife-crime-london-stabbing-death-police-investigations-weapons-a8413516.html> (accessed 17 February 2021).
- The Independent Commission on Youth Crime and Antisocial Behaviour (2010) *Time for a fresh start: The report of the Independent Commission on Youth Crime and Antisocial Behaviour*. London: The Police Foundation.
- The Sun. (2018) *London is being gripped by a knife crime epidemic – this needs fixing NOW*. The Sun. Available at: <https://www.thesun.co.uk/news/5952757/knife-crime-epidemic/> (accessed 17 February 2021).
- Thissen, D. and Steinberg, L. (2009) 'Item response theory', in Millsap, R. E. & Maydeu-Olivares, A. (eds.) *The Sage handbook of quantitative methods in psychology*. London: Sage Publications, pp.148-177.
- Thomas, W. I. and Znaniecki, F. (1918) *The Polish peasant in Europe and America: Monograph of an immigrant group*. University of Chicago Press.
- Thompson, K. (2017) *The strengths and limitations of secondary data*. Research Methods: Thompson, Karl. Available at: <https://revisesociology.com/2017/04/24/the-strengths-and-limitations-of-secondary-data/> (accessed 24 April 2017).
- Thornberry, T. P. and Krohn, M. D. (2000) 'The self-report method for measuring delinquency and crime', *Measurement and Analysis of Crime and Justice: Criminal Justice*, 4.

- Timan, J. (2021) *Knife crime, assaults and anti-social behaviour: spike in incidents on Metrolink*. Available at: <https://www.theoldhamtimes.co.uk/news/19717239.knife-crime-assaults-anti-social-behaviour-spike-incident-metrolink/> (accessed 20 July 2022).
- Tolan, P. H., Guerra, N. G. and Kendall, P. C. (1995) 'A developmental ecological perspective on antisocial behavior in children and adolescents: Toward a unified risk and intervention framework', *Journal of Consulting and Clinical Psychology*, 63(4), pp. 579-584.
- Torjesen, I. (2016) *Austerity cuts are eroding benefits of Sure Start children's centres*. London: BMJ. Available at: <https://www.bmj.com/content/352/bmj.i335> (accessed 11 Feb 2021).
- Tzoumakis, S., Whitten, T., Piotrowska, P., Dean, K., Laurens, K. R., Harris, F., Carr, V. J. and Green, M. J. (2020) 'Gender and the intergenerational transmission of antisocial behavior', *Journal of Criminal Justice*, 67, pp. 1-8.
- UCLA. (2018) *Logistic regression: Stata data analysis examples*. Institute for Digital Research & Education. Available at: <https://stats.idre.ucla.edu/stata/dae/logistic-regression/> (accessed April 12 2021).
- UCLA. (2019) *How can I perform the likelihood ratio and wald test in stata*. Institute for Digital Research & Education. Available at: <https://stats.idre.ucla.edu/stata/faq/how-can-i-perform-the-likelihood-ratio-wald-and-lagrange-multiplier-score-test-in-stata/> (accessed 15 April 2019).
- UCLA. (2020) *What does cronbach's alpha mean?*. Available at: <https://stats.idre.ucla.edu/spss/faq/what-does-cronbachs-alpha-mean/> (accessed 01 September 2020).
- UCLA. (2022) *Zero-Inflated Poisson Regression: R data Analysis Examples*. Advantage Research Computing Statistical Methods and Data Analytics. Available at: <https://stats.oarc.ucla.edu/r/dae/zip/> (accessed 17. August 2022).
- Underwood, L. G. and Teresi, J. A. (2002) 'The daily spiritual experience scale: Development, theoretical description, reliability, exploratory factor analysis, and preliminary construct validity using health-related data', *Annals of Behavioral Medicine*, 24(1), pp. 22-33.
- University of London, Institute of Education and Centre for Longitudinal Studies. (2017) *Millennium Cohort Study: Geographical Identifiers, Sixth Survey, 2011 Census Boundaries: Secure Access*. UK Data Service. Available at: <http://doi.org/10.5255/UKDA-SN-8232-1> (accessed 25 October 2019).
- University of London, Institute of Education and Centre for Longitudinal Studies. (2019) *Millennium Cohort Study: Sixth Survey*. UK Data Service. Available at: <http://doi.org/10.5255/UKDA-SN-8156-4> (accessed 25 October 2019).
- Van den Bree, M. B. and Pickworth, W. B. (2005) 'Risk factors predicting changes in marijuana involvement in teenagers', *Archives of General Psychiatry*, 62(3), pp. 311-319.
- Velasquez, B. C. (2012) *Individual and neighbourhood determinants of adolescent aggressive behaviour: A multilevel analysis* PhD thesis, University of Bristol.
- Vernberg, E. M. (1990) 'Experiences with peers following relocation during early adolescence', *American Journal of Orthopsychiatry*, 60(3), pp. 466-472.
- Verrecchia, P., Fetzter, M. D., Lemmon, J. H. and Austin, T. L. (2010) 'An examination of direct and indirect effects of maltreatment dimensions and other ecological risks on persistent youth offending', *Criminal Justice Review*, 35(2), pp. 220-243.
- Violato, M., Petrou, S., Gray, R. and Redshaw, M. (2011) 'Family income and child cognitive and behavioural development in the United Kingdom: does money matter?', *Health Economics*, 20(10), pp. 1201-1225.
- Vold, G. and Bernard, T. (1986) *Theoretical Criminology*. Oxford: Oxford University Press.
- Wagner, E. F. (1996) 'Substance use and violent behavior in adolescence', *Aggression and Violent Behavior*, 1(4), pp. 375-387.
- Waiton, S. (2008) *The politics of antisocial behaviour: Amoral panics*. Oxon: Routledge.

- Walker, J., Crawford, K. and Taylor, F. (2008) 'Listening to children: gaining a perspective of the experiences of poverty and social exclusion from children and young people of single-parent families', *Health & Social Care in the Community*, 16(4), pp. 429-436.
- Waller, R., Gardner, F. and Hyde, L. W. (2013) 'What are the associations between parenting, callous-unemotional traits, and antisocial behavior in youth? A systematic review of evidence', *Clinical Psychology Review*, 33(4), pp. 593-608.
- Walters, G. D. (2018) 'Sibling delinquency as a risk factor for future offending: An exploratory analysis', *Youth Violence and Juvenile Justice*, 16(4), pp. 343-357.
- Washbrook, E. (2010) *Early environments and child outcomes: an analysis commission for the Independent Review on Poverty and Life Chances*. PhD thesis, University of Bristol.
- Wasserman, G. A., Keenan, K., Tremblay, R. E., Coie, J. D., Herrenkohl, T. I., Loeber, R. and Petechuck, D. (2003) *Risk and Protective Factors of Child Delinquency*. Washington DC: U.S. Department of Justice.
- Webber, C. (2021) 'Rediscovering the relative deprivation and crime debate: Tracking its fortunes from left realism to the precariat', *Critical Criminology*, 30, pp. 1-27.
- Wells, L. E. and Rankin, J. H. (1991) 'Families and delinquency: A meta-analysis of the impact of broken homes', *Social Problems*, 38(1), pp. 71-93.
- Wells, P. (2007) 'New Labour and evidence based policy making: 1997-2007', *People, Place & Policy Online*, 1(1), pp. 22-29.
- Welshman, J. (2007) *Underclass: a history of the excluded, 1880-2000*. London: Hambledon Continuum.
- White, H., Bates, M. E. and Buyske, S. (2001) 'Adolescence-limited versus persistent delinquency: extending Moffitt's hypothesis into adulthood', *Journal of Abnormal Psychology*, 110(4), pp. 600-609.
- White, H. R. (1992) 'Early problem behavior and later drug problems', *Journal of Research in Crime and Delinquency*, 29(4), pp. 412-429.
- White, H. R., Brick, J. and Hansell, S. (1993a) 'A longitudinal investigation of alcohol use and aggression in adolescence', *Journal of Studies on Alcohol, Supplement*, (suppl 11), pp. 62-77.
- White, H. R., Hansell, S. and Brick, J. (1993b) 'Alcohol use and aggression among youth', *Alcohol Research and Health*, 17(2), pp. 144-150.
- White, J., Moffitt, T. E., Earls, F., Robins, L. N. and Silva, P. A. (1990) 'How early can we tell? Preschool predictors of boys' conduct disorder and delinquency', *Criminology*, 28, pp. 507-533.
- Whiteside, M., Mills, J. and McCalman, J. (2012) 'Using secondary data for grounded theory analysis', *Australian Social Work*, 65(4), pp. 504-516.
- Wickert, C. (2022) *General Theory of Crime*. Available at: <https://soztheo.de/theories-of-crime/control/general-theory-of-crime-gottfredson-hirschi/?lang=en> (accessed).
- Wikström, P.-O. H. (1998) 'Communities and crime', in Tonry, M. (ed.) *The handbook of crime and punishment*. New York: Oxford University Press, pp.269-301.
- Wikstrom, P.-O. H. and Loeber, R. (2000) 'Do disadvantaged neighborhoods cause well-adjusted children to become adolescent delinquents? A study of male juvenile serious offending, individual risk and protective factors, and neighborhood context', *Criminology*, 38(4), pp. 1109-1142.
- Wikström, P.-O. H. and Sampson, R. J. (2003) 'Social mechanisms of community influences on crime and pathways in criminality', in Lahey, B., Moffitt, T. & Caspi, A. (eds.) *The causes of conduct disorder and serious juvenile delinquency*. New York: Guilford, pp.118-148.
- Wilkins, L. T. (1964) *Social deviance : Social policy, action, and research*. London: Tavistock Publications.
- Williams, S. and McGee, R. (1994) 'Reading attainment and juvenile delinquency', *Journal of Child Psychology and Psychiatry*, 35(3), pp. 441-459.
- Wilson, J. Q. and Kelling, G. L. (1982) 'Broken windows', *Atlantic Monthly*, 249(3), pp. 29-38.
- Winslow, E. B. and Shaw, D. S. (2007) 'Impact of neighborhood disadvantage on overt behavior problems during early childhood', *Aggressive Behavior*, 33(3), pp. 207-219.

- Wong, D. W. (2009) Modifiable Areal Unit Problem. *In: Kitchin, R. & Thrift, N. (eds.) International Encyclopedia of Human Geography*. Elsevier Science.
- Wright, K. A., Kim, B., Chassin, L., Losoya, S. H. and Piquero, A. R. (2014) 'Ecological context, concentrated disadvantage, and youth reoffending: Identifying the social mechanisms in a sample of serious adolescent offenders', *Journal of Youth and Adolescence*, 43, pp. 1781-1799.
- Youdell, D. and McGimpsey, I. (2015) 'Assembling, disassembling and reassembling 'youth services' in Austerity Britain', *Critical Studies in Education*, 56(1), pp. 116-130.
- Young, J. (1992) 'Ten Points of Realism', in Young, J. & Matthews, R. (eds.) *Rethinking criminology: The realist debate*. London: Sage, pp.24-68.
- Young, R., Sweeting, H. and West, P. (2007) 'A longitudinal study of alcohol use and antisocial behaviour in young people', *Alcohol & Alcoholism*, 43(2), pp. 204-214.
- Youth Justice Board (2001) Youth Justice Board For England and Wales: Corporate plan 2002-03 to 2004-05 and business plan 2002-03. London: Youth Justice Board.
- Youth Justice Board (2014) *AssetPlus Rationale*. London: YJB.
- Youth Justice Board (2016) Annual report and accounts 2015/16. London: The Youth Justice Board for England and Wales.
- Youth Justice Board (2017) Monthly youth custody report - May 2017: England and Wales. *In: Board, Y. J. (ed.)*. London: Youth Justice Board.
- Youth Justice Board (2018) Annual report and accounts 2017/18. London: The Youth Justice Board for England and Wales.
- Youth Justice Board (2021) Youth Justice Statistics 2019/20. *In: Youth Justice Board & Ministry of Justice (eds.)*. London: Youth Justice Board.
- Zwiers, M., Kleinhans, R. and Van Ham, M. (2015) Divided cities: increasing socio-spatial polarization within large cities in the Netherlands. Institute for the Study of Labor.

Appendices

Appendix Chapter 5

Table A 1 Measurement model for each level of explanatory variables

Variable	Questions/Description	Adopted Response	Variable Construct Process	Data
Dependent Variables				
<i>Antisocial behaviour</i>	10 questions on Rude/noisy in public, Shoplifting, Graffiti, Vandalism, Hitting someone, Stealing, Carrying a weapon, Using a weapon, Street gang, Robbery, Police questioning, Police caution and Being arrested	Continuous: Yes/No (10 items, 0 to 10; $\alpha = .73$)	The responses to the 10 questions were aggregated to construct a continuous variable.	MCS6 Young Person Questionnaire, Victimisation and Risky Behaviours Module
<i>Severe antisocial behaviour</i>		Categorical: Never Minor ASB Severe ASB	The original 10 types of ASBs were categorised to the following 3 groups: Never tried any; Minor ASB (Rude/noisy in public, Graffiti, Vandalism, Hitting someone, Police questioning & Police caution); and Severe ASB (Carrying weapon, Using a weapon, Street gang, & Shoplifting).	
Individual & Family Level Explanatory Variables				
Socio-demographic Factors				
<i>Gender</i>	Gender of the young people	Categorical: Male Female		MCS6, household grid, Household module
<i>Ethnic minority</i>	What is your ethnic group?	Categorical: White Others	There were originally 11 response categories (White, Mixed, Indian, Pakistani, Bangladeshi, Other Asian, Black Caribbean, Black African, Other Black, Chinese and Other ethnic group). All categories, except "White" were aggregated to make "other".	MCS6 Young Person Questionnaire, Identity Module
<i>Social housing</i>	Do you (or your husband/wife/partner) own or rent your home or have some other arrangement?	Categorical: Home owner & Private rent Social housing	Originally there were 9 response categories (own outright, own-mortgage/loan, part rent/ part mortgage, rent from local authority, rent from housing association, rent privately, living with parents, living rent free, and other) Rent from housing association and local authority were aggregated to construct "social housing".	MCS6 Parent Questionnaire, Housing and Local Area Module
<i>Low house-hold income</i>	OECD equivalised income quintiles by country variable	Categorical: Low household income Others	The variable was originally coded as "bottom quintile" 1, "second quintile" 2, "third quintile" 3, "fourth quintile" 4, and "top quintile" 5 which was recoded as "top quintile" 1 to "bottom quintile" 5 to construct low household income variable.	MCS6 Parent Questionnaire, Employment, Income and Education Module

<i>Single-parent household</i>	Constructed using MCS derived Household composition variable	Categorical: Single-parent household Other family type	The original response categories for household composition variable were 20. Among them, natural mother/father only, adoptive mother only, step father only, and grandmother/father only categories were aggregated to construct "single-parent household".	MCS6 Parent Questionnaire, Family Context Module
Behavioural Factors				
<i>Use of Illegal drugs</i>	How many times have you used or smoked cannabis (also known as weed, marijuana, dope, hash or skunk)?	Categorical: Never 1 to 2 times > 3 times	Originally there were 6 response categories (not applicable, once or twice, 3 or 4 times, 5 to 10 times, and > 10 times). Since "not applicable" means they have not smoked cannabis, it was changed to "never" and the response categories were aggregated to the three categories.	MCS6 Young Person Questionnaire, Victimization and Risky Behaviours module
<i>Risk taking</i>	Cambridge Gambling Task, Measurements of Risk taking	Continuous: (.05 to .95)	The risk taking outcome is the mean proportion of the current points total that the respondent chooses to gamble on trials when they have selected the most likely outcome.	Cambridge Gambling Task, Measurements of Risk taking
<i>Victim of ASB</i>	Has anyone done any of the below things to you in the past 12 months? Insulted you, called you names, threatened or shouted at you in a public place, at school or anywhere else; Been physically violent towards you; Hit you with or used a weapon against you; Stolen something from you; Made an unwelcome sexual approach to you or assaulted you sexually	Categorical: Never 1 type 2 types > 3 types	The response categories of the five questions were "yes" 1 and "no" 0. When answered yes to more than three types, it was aggregated to one response category. "> 3 types".	MCS6 Young Person Questionnaire, Victimization and Risky Behaviours Module
<i>Low bond with school</i>	How often do you try your best at school?; How often do you find school interesting?; How often do you feel unhappy at school?; How often do you get tired at school?; How often do you feel school is a waste of time?; How often do you find it difficult to keep your mind on your work at school?; How often do you misbehave or cause trouble in lessons?	Continuous: Never Some of the time Most of the time All of the time (7 items, 0 to 21; $\alpha = .88$)	Responses to the first 2 indicators were recoded as "never" 3, "some of the time" 2, "most of the time" 1, and "all the time" 0 which originally were "never" 4, "some of the time" 3, "most of the time" 2, "all the time" 1. Responses to the other five indicators were recoded as "never" 0, "some of the time" 1, "most of the time" 2, "all the time" 3. The responses to the questions were aggregated to construct a continuous variable.	MCS6 Young Person Questionnaire, Education Module
<i>Drug taking friends</i>	Do any of your friends take cannabis (weed) or any other illegal drugs?	Categorical: None of them Some of them Most or all of them	There were originally 4 response categories (none of them, some of them, most of them and all of them). The last two categories were aggregated to construct "most or all of them". The responses to the questions were aggregated to construct a continuous variable.	MCS6 Young Person Questionnaire, Family, Friends and Relationships Module
<i>Friends with school trouble</i>	How many of your close friends get into a lot of trouble at school?	Continuous: Never Sometimes Usually Always (3 items, 0 to 9; $\alpha = .82$)	The responses were recoded as "always" 0, "usually" 1, "sometimes" 2, and "never" 3 which originally were "always" 1, "usually" 2, "sometimes" 3, "always" 4. The responses to the questions were aggregated to construct a continuous variable.	MCS6 Parent Questionnaire, Parenting Activities Module

Neighbourhood Level Explanatory Variables

Structural factors

<i>Ethnic minority status</i>	Rate of Black, Black British & Mixed ethnic population	Continuous: (0 to 100)	The number of Black, Black British & Mixed people was divided by the total number of people, then multiplied by 100.	2011 Census Data
<i>Single-parent household</i>	Rate of single-parent headed households		The number of single-parent households was divided by the total number of households, then multiplied by 100.	
<i>Low level occupation</i>	Rate of lower supervisory & technical occupations, Semi-routine & Routine occupations, Routine occupations and Unemployed population		The number of people with low level occupation was divided by the total number of people, then multiplied by 100.	
<i>Unemployment</i>	Rate of long-term unemployed and never-worked population		The number of long-term unemployed and never-worked people was divided by the total number of people who are eligible to work, then multiplied by 100.	
<i>Own outright</i>	Rate of households with own outright		The number of households with own housing outright was divided by the total number of households, then multiplied by 100.	
<i>Shared accommodation</i>	Rate of households with shared dwelling		The number of households with shared dwelling was divided by the total number of households, then multiplied by 100.	
<i>No-central heating</i>	Rate of households without central heating		The number of households without central heating was divided by the total number of households, then multiplied by 100.	
<i>Bad health condition</i>	Rate of people with bad & very bad health conditions		The number of people with bad & very bad health conditions was divided by the total number of people, then multiplied by 100.	
Perception factor				
<i>Unsafe neighbourhood</i>	How safe is it to walk, play or hang out in this area during the day? By this area we mean within about a mile or 20-minute walk from your home.	Top 20% unsafe areas Rest of the areas	There were originally 4 response categories (very safe, safe, not very safe, and not at all safe). The mean value of the individual level unsafe variable was measured to create the neighbourhood level unsafe variable.	MCS6 Young Persons Questionnaire, Activities Module

Source: Sixth survey of the MCS (author's analysis, weighted data); 2011 Census Data

Table A 2 Individual and Family level explanatory variables of antisocial behaviour in the MCS

Variable	Original variable type	Binary variable
Socio-demographic Factors		
<i>Gender</i>	Binary	Male/Female
<i>Low household income</i>	Categorical (1-5: Lower to Highest quintile)	2nd to 5 th /Lowest quintile (bottom 20%)
<i>Ethnic minority status</i>	Categorical (1-6: White, Mixed, Indian, Pakistani & Bangladeshi, Black or Black British and Other)	White/Other
<i>Social housing</i>	Categorical (1-9: Own outright, Own-mortgage/loan, Part rent/part mortgage, Rent from local authority, Rent from housing association, Rent privately, Living with parents, Living rent free and Other)	Own and Rent/ Social housing
<i>Single-parent household</i>	Categorical (1-19: Both natural parents, Natural mother and step-parent, Natural mother and other parent, Natural mother and adoptive parent, Natural father and step-parent, Natural father and other parent, Two adoptive parents, Two foster parents, Two grandparents, Grandmother and other parent, Two other parents, Natural mother only, Natural father only, Adoptive mother only, Grandmother only, Other parent only, Step father only, Grandfather only, Adoptive mother and step parent and Two step-parents)	Single-parent household/ Other family type
Behavioural factors		
<i>Use of illegal drugs</i>	Categorical (1/6: not applicable, once or twice, 3 or 4 times, 5 to 10 times, and > 10 times)	Never/More than once
<i>Risk taking</i>	Continuous (.05-.95)	0 .05-.64/.65-0.95 (top 20%)
<i>Drug taking friends Friends with school trouble</i>	Categorical (1-4: None, Some, Most and All of them)	None of them/ > 1 None of them/ > 1
<i>Victim of antisocial behaviour</i>	Continuous (0-5) -5 yes (1) no (0) questions: being insulted, threatened, shouted/ physically violated/ hit or used a weapon against/ stolen something from/sexually assaulted	Yes to < 3 items/ Yes to at least 3 items
<i>Low parental supervision</i>	Continuous (0-9) -3 questions on how often the parent knows when the child is out: who she/he is with, where she/he is and what she/he is doing. -responses: always (0) usually (1) sometimes (2) never (3)	0-4/5-9 (neglectful: highest 10%)

Source: Sixth survey of the MCS (author's analysis, weighted data)

Table A 3 Experience of at least one type of antisocial behaviour by government office region

Government Office Region	age 14 (any yes)	
	Percent	Frequency
North East	48.54	150
North West	44.77	415
Yorkshire and the Hum	39.98	363
East Midlands	42.70	266
West Midlands	39.44	351
East of England	38.21	321
London	42.48	480
South East	43.62	516
South West	39.21	258
Wales	42.94	672
Scotland	45.90	565
Northern Ireland	42.20	460
Total	42.43	4,817

Source: Sixth survey of the MCS (author's analysis, weighted data)

Appendix 5.1 Comparison of the relevant datasets

Several datasets concerning young people and their behaviours are available in the UK for secondary data analysis, such as the Longitudinal Study of Young People in England, the Millennium Cohort Study and Offending, Crime and Justice Survey. Among these, datasets were excluded if they do not have the dependent variable, antisocial behaviour, or the independent variable, neighbourhood perception; if the dataset was collected prior to the 2000s; or if the sample does not include at least England.⁷⁸ After the exclusion procedure, three datasets, namely the Millennium Cohort Study (MCS), the Offending, Crime and Justice Survey (OCJS) and the Second Longitudinal Study of Young People in England (2LSYPE) were short-listed and a further comparison was made to choose the most appropriate dataset for this study (see Table A 4 below).

The OCJS covers areas of England and Wales and a variety of age groups, namely individuals aged between 10 and 25 years, which could help the result to be generalised to various age groups of young people living in England and Wales. The OCJS includes several questions, including asking about young people's perception of their own neighbourhood, which could provide the neighbourhood perception variable, one of the explanatory variables of this study.

⁷⁸ Since this study aims to look at the neighbourhood effects on antisocial behaviour among young people of England and Wales, datasets which do not include the sample of England (at least) were excluded.

However, it does not provide low level geographical identifiers, which are essential considering the nature of this study (conducting neighbourhood level analysis). The OCJS has the smallest sample size (5,353 in the fourth wave) among the three datasets and compared to the MCS and the 2LSYPE, it is relatively outdated, as it was conducted from 2003 to 2006.

Table A 4 Summary of comparison of the relevant datasets

Data	Millennium Cohort Study (6th wave)	Offending, Crime and Justice Survey (4th wave)	Second Longitudinal Study of Young People in England (1st wave)
Age of young people (Surveyed year: sample size)	14 years old (2015: 14,790/ England & Wales)	13 to 28 years old (2006: 5,353/ England & Wales)	13 to 14 years old (2013: 13,100/ England)
Dependent variable (Antisocial behaviour)	-13 questions on behaviours in public place, offensive behaviours, use of weapons, experience of stealing, police involvement and gang activity	- 10 questions on behaviours in public place and school, offensive behaviours and use of weapons	-7 questions on behaviours in public place, offensive behaviours, use of weapons and experience of stealing
Independent variable (Neighbourhood perception)	- 1 question both to the participants and their parents on the safety of the area they live in	- 8 questions on the safety and general condition of the area they live in	- 1 question on the safety of the area they live in
Neighbourhood Identifier	-Secure access version: detailed geographical identifier	-10 government office region - 42 Police force area	- Safe room access version: detailed geographical identifier
Strengths	-Has a dependent and neighbourhood perception variable and low-level neighbourhood identifiers -Has a big sample size -covers England and Wales	-Has a dependent variable some neighbourhood perception variables -Covers a variety of age groups and England and Wales	-Has a dependent variable -has low level neighbourhood identifiers -Has a big sample size
Weaknesses	-Has just 1 question on neighbourhood perception -Does not cover a variety of age groups	-The possibility of using low level neighbourhood identifiers is unclear -Relatively outdated	-Has 1 question on neighbourhood perception -Does not cover a variety of age groups and only covers England

Note: See Appendix Table A 5 below for further detail.

Source: Sixth survey of the MCS; 2LSYPE Wave 1; OCJS Wave 1

The 2LSYPE has a large sample size (13,100 in the first wave) and provides low-level geographical identifiers, which would make it possible for this study to conduct neighbourhood level analysis. Nevertheless, it only covers respondents aged 13 and 14 (the first wave) in

England, which would limit the generalisability of the results. Moreover, it has relatively insufficient antisocial behaviour indicators in comparison to the other two datasets.

The MCS has a large sample size (14,790 in the sixth wave) among the three datasets and it is equipped with multiple neighbourhood level variables. The MCS provides geographical identifiers that are essential to conduct neighbourhood level analysis and it is the most recent dataset out of the three. From the nationwide (the UK) MCS, the target sample of this study, young people in England and Wales, is also available. However, the MCS does not include older adolescents, considering that the currently available sweeps are the first to sixth, which were carried out when the cohort members were aged 9 months, and 3, 5, 7, 11 and 14 years old. Among the three datasets, the MCS was selected for this study over the others for several reasons which is described in section 5.2.1.

Table A 5 Comparison of the relevant secondary datasets

Data	Sample Size (Surveyed year: Age)	Study Design (Sampling Method)	Dependent Variable (Antisocial behaviour)	Independent Variable (Neighbourhood perception)	Geo-graphical Identifier	Strengths	Weaknesses
MCS Wave 5	13,469 (2012:11)	Cohort study (Multi-stage stratified random sample)	- 4 questions: Have you ever... (been noisy or rude in a public place/ taken something from a shop without paying for it/ written things or sprayed paint on a building on purpose/ damaged anything in a public place)	- 2 questions to children: How safe is it to walk, play or hang out in this area during the day/ Are there any parks in this area where children your age can play - 3 questions to parents: Is this a good area to bring up a child/ Whether have friends or family in the area/ Are there any parks, playgrounds or public spaces in this area where your child can play outdoors	-Secure access version: Lower Layer Super Output Areas	-provide neighbourhood perception variable -big sample size -national data	-limited age groups (ages 11 & 14)
Wave 6	11,872 (2015:14)		-13 questions: In the last 12 months have you...(been noisy or rude in a public place /taken something from a shop without paying for it/ written things or spray painted on a building, fence or train or anywhere else where you shouldn't have/ on purpose damaged anything in a public place that didn't belong to you/ ever carried a knife or other weapon for your own protection / ever gone into someone's home without their permission/ pushed or shoved hit slapped or punched someone/ used or hit someone with a weapon/ stolen something from someone/ ever been stopped and questioned by the police/ ever been given a formal warning or caution by a police officer/ ever been arrested by a police officer)/ Are you a member of a street gang	- 1 question to children: How safe is it to walk, play or hang out in this area during the day - 1 question to parents: How safe is it for young people of [all cohort members' names]'s age to walk, play or hang out in this area during the day? - 11 questions to interviewers: General condition of buildings in street/ Security blinds etc./Traffic calming/ Volume of traffic/ Burnt-out cars on the street/litter etc. in the street/dog mess on the pavement/ graffiti on walls or on public/evidence of vandalism /arguing or fighting on street/How did you feel in the street			
OCJS Wave 1	4,577 (2003:10-25 in 2003)	Rotating panel (Multi-stage stratified random sample)	- 8 questions on behaviours in public place and school, offensive behaviours and use of weapons and the frequency of the behaviours - Questions: Last 12 months... (tried to avoid paying fare on public transport/ been noisy or rude in public place/neighbour complained/ written things, sprayed paint on building/ picked on or bullied school pupil/ threatened been rude to someone because of race, religion or colour/ been joy-riding in a car/ carried a knife or weapon)	- 8 questions: This area is a friendly place to live/ I trust most people who live in this area/ You often see strangers in this area/ If children causing trouble, local people will tell them off/ People move in and out of my area a lot/ How safe you feel walking alone in this area after dark/ Drop wallet near you live with name & address - get back/ Common in your area...(Noisy neighbours, Teenagers around causing problems, People sleeping rough in public places, People harassed street (skin colour), People using or selling	-10 government office region - 42 Police force area	-provide neighbourhood perception variable -variety of age groups (ages 10-25) -covers England and Wales	-the possibility of using low level neighbourhood identifiers is unclear -relatively outdated
Wave 2	5,332 (2004)		- 10 questions: Last 12 months... (tried to avoid paying fare on public transport/ been noisy or rude in public				

Wave 3	5,238 (2005)		place/neighbour complained/ written things, sprayed paint on building/ picked on or bullied school pupil/ threatened	drugs, People being drunk or rowdy in public, Rubbish or litter lying around,			
Wave 4	5,353 (2006)		been rude to someone because of race, religion or colour/ been joy-riding in a car/ carried knife/ carried gun/ carried a knife or weapon)	Abandoned, burnt out cars, People begging)			
2LSOPE Wave 1	13100 (2013:13-14)	Longitudinal study (Multi-stage stratified random sample)	- 7 questions: In the last 12 months have you... (written things or sprayed paint on a building, fence or train or anywhere else you shouldn't have/damaged anything in a public place that didn't belong to you on purpose/ ever taken something from a shop, supermarket, or department store without paying/ ever hit or attacked anyone on purpose with an object or weapon/ ever hit or attacked anyone without using an object or weapon/ ever carried a knife or other weapon for your own protection or in case you got into a fight), Are you a member of a street gang?	- 1 question: How much do you agree or disagree with the following statement - I feel safe in the area where I live	- Safe Room Access version: Local Authority Districts/ Super Output Areas	-provide low level neighbourhood identifiers -big sample size	-limited neighbourhood perception variable -limited age groups (ages 13-15) -covers England

Appendix 5.2 Data: The Millennium Cohort Study

Response Rate⁷⁹

Table A 6 below shows the proportion of productive and unproductive interview cases in England and Wales by category. “The percentages of productive cases declined over time from 95.4 percent in MCS1 to 62.4 percent in MCS6. The category of ‘Refusals’ refers to respondents who refused to participate in a specific sweep of data collection, and ‘Not issued’ consists of respondents who have not taken part in the survey on two consecutive occasions, and thus were no longer included for fieldwork. ‘No contact’ has decreased over time since respondents in this category have either been contacted again or have moved to the ‘Not issued’ category. ‘Ineligible’ contains child deaths, sensitive cases, and emigrants. ‘Untraced movers’ consist of respondents who have changed address and were not located, such as possible emigrants. In sum, 692 respondents who were not included in MCS1 are categorised as ‘New Families’”(Mostafa and Ploubidis, 2017, p.2).

Table A 6 Productive and unproductive cases in the MCS sweeps 1-6

	MCS1		MCS2		MCS3		MCS4		MCS5		MCS6	
	<i>Freq</i>	%										
Productive	14,292	95.4	12,311	82.2	11,898	79.4	10,857	72.5	10,499	70.1	9,347	62.4
Refusal			1,229	8.2	1,748	11.7	1,356	9.0	1,643	11.0	2,308	15.4
Ineligible			123	0.8	221	1.5	96	0.6	62	0.4	37	0.2
Untraced movers			545	3.6	430	2.9	560	3.7	275	1.8	291	1.9
No contact			720	4.8	458	3.1	101	0.7	374	2.5	66	0.4
Not issued	692	4.6					1,683	11.2	2,126	14.2	2,838	18.9
Other unproductive			56	0.4	229	1.5	331	2.2	5		97	0.6
Total	14,984	100	14,984	100	14,984	100	14,984	100	14,984	100	14,984	100

Source: MCS Sweeps 1-6 User guide (author’s analysis: unweighted data)

⁷⁹ The information on ‘response rate’ in this section is mostly direct quotes from the MCS Sixth Survey Technical Report on Response (Mostafa and Ploubidis, 2017).

Data Collection of the sixth sweep of the Millennium Cohort Study⁸⁰

For the MCS6, “the selected sections of the young person questionnaire were tested using cognitive methods in October and November 2013. The objective was to test wordings of the questions to make sure comprehension by 14-year-olds; to explore cognitive processes young people went through to produce answers; to understand how young people comprehended and interpreted the meaning of particular terms and words in the questions; and to offer recommendations to revise the wording of questions to improve reliability” (Fitzsimons, 2017, p.9)

“The fieldwork for MCS6 was conducted by a market research organisation, Ipsos Mori which took place between January 2015 and March 2016, which was compressed into school years. The MCS6 includes an interview (computer-assisted personal interview and computer-assisted self-interview) with the main parent and partner (where relevant), a self-completion interview with the cohort members, cognitive assessments for the main parent, the partner and the cohort member, DNA collection of the cohort member and natural parents in the household, physical measurements of the cohort member, placement of a time-use diary and accelerometer with the cohort member” (Fitzsimons, 2017, p.6).

“The first pilot survey of the MCS6 was conducted between February and March 2014 in England, Scotland and Wales using a quota sample to guarantee that a representative cross-section of households was added. Fifty families were interviewed. The dress rehearsal fieldwork was conducted between July and August 2014 across all countries. In total, 200 addresses were issued. Of these, 152 were longitudinal samples and 48 were new households” (Fitzsimons, 2017, p.10).

“The first sweep of the fieldwork started in England, Wales, Scotland, and Northern Ireland in January 2015. All interviewers attended a three-day briefing before conducting the fieldwork. Fieldwork took place between January 2015 and March 2016 which was compressed into school years” (Fitzsimons, 2017, p.11).

⁸⁰ The information on ‘data collection’ in this section is mostly direct quotes from the MCS 2015-2016 user guide (Fitzsimons, 2017).

Appendix 5.3 Analysis Strategy: Multilevel modelling⁸¹

Variance Component Model

Variance component model is the special case of the random intercept model with no covariates. The two-level variance components model which is the simplest multilevel model is described in mathematical notations as follows:

$$Y_{ij} = \beta_{0j} + e_{ij} \quad [5.1]$$

The subscript i is for individuals ($i=1 \dots n_i$) and the subscript j is for higher level units, for this study, neighbourhoods ($j= 1 \dots J$). The β_{0j} is the unique intercept of the j^{th} neighbourhood unit. “The residual for the individual level model or unique effect of individual i in neighbourhood unit j is represented by e_{ij} , which is considered to be normally distributed with mean 0 and variance σ_e^2 , that is, $e_{ij} \sim N(0, \sigma_e^2)$ ” (Kim, 2004, p.98).

In multilevel modelling, the intercept β_{0j} is presented in a regression equation in the higher-level unit as stated below:

$$\beta_{0j} = \gamma_{00} + \mu_{0j} \quad [5.2]$$

Here γ_{00} is the overall intercept (or grand mean) and μ_{0j} is the random intercept variance which is the random effects of the j^{th} neighbourhood to the intercept that is assumed to be normally distributed with mean 0 and variance σ_u^2 , that is, $\mu_{0j} \sim N(0, \sigma_u^2)$. Single equation model by substituting [5.2] into [5.1] yields equation [5.3].

$$Y_{ij} = \gamma_{00} + \mu_{0j} + e_{ij} \quad [5.3]$$

Using this model, the intraclass correlation coefficient (ICC) could be defined using the following equation:

$$ICC = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_e^2} \quad [5.4]$$

ICC measures the percentage of the variance explained by the grouping structures in the population (Hox, 2010). Equation 5.4 simply indicates that ICC is the proportion of group-level variance in comparison to the overall variance. ICC is measured in order to quantify the degree of clustering or dependence in the data (Sommet and Morselli, 2017). The more clustering

⁸¹ The explanation on multilevel modelling in this sub-section is largely derived from Hox (2010), Hox et al., (2017) Kim (2004), Raudenbush and Bryk (2002), and Steele (2008b).

there is, the more we need a multilevel modelling, however, multilevel models are typically preferred even when the degree of clustering is low.

In addition to ICC test, this study also tests between group variance in order to find out whether the variance-components models provide an improved fit to the data at a statistically significant level compared to tradition regression models using LR test.⁸² Compared to the single-level model, the variance components model has one additional parameter σ_u^2 and so this study compares LR to a chi-squared distribution with one degree of freedom.

Random Intercept Multilevel Model

Random intercept models allow this study to discover to what extent differences between individuals in their values of antisocial behaviour variable are due to their membership of neighbourhoods, while accounting for level-1 predictors. The two-level random intercept model with one level-1 explanatory variable is written as:

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + e_{ij} \quad [5.5]$$

In multilevel model, the intercept β_{0j} and the slope β_{1j} are presented in a regression equation in the higher-level unit as stated below:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + \mu_{0j} \quad [5.6]$$

$$\beta_{1j} = \gamma_{10} \quad [5.7]$$

γ_{00} is the overall intercept (or grand mean) and γ_{01} is the overall regression coefficient (or the slope) between antisocial behaviour variable and neighbourhood level variable Z_j . Here, γ_{10} in equation [5.7] means total regression coefficient between antisocial behaviour and level-1 factor and equation [5.7] states that no unique contributions of each level-2 unit to the effects in the regression model, of the level-1 variables exists. Single equation model by substituting [5.6], [5.7] into [5.5] yields equation [5.8]

$$Y_{ij} = \gamma_{00} + \gamma_{01}Z_j + \gamma_{10}X_{ij} + \mu_{0j} + e_{ij} \quad [5.8]$$

This model, [5.8] is usually referred to as a random intercept model since the intercept of the group regression lines is relaxed to vary randomly across neighbourhoods where the overall slop coefficient is shared by all neighbourhoods. In other words, only the intercept coefficient, β_{0j} , is considered to be random, while regression coefficient, β_{1j} , is restricted to having a common effect for all neighbourhoods (see Equation [5.5]). The segment $[\gamma_{00} + \gamma_{01}Z_j + \gamma_{10}X_{ij}]$

⁸² The LR test statistic is twice the difference in the log-likelihoods, or equivalently it is the reduction in the deviance (i.e., the drop in badness of fit).

in equation [5.8] includes the fixed coefficients which is referred to as the fixed parts of the model (Hox, 2010) and could be defined as the total associations between level-1 factors and dependent variable, across all neighbourhoods (Habibova and Afandi, 2011). The other segments $[\mu_{0j} + e_{ij}]$ includes the random error terms, which are referred to the random parts of the model and could be described to be the variations between neighbourhoods in antisocial behaviour that could not be explained by level-1 explanatory variables (Habibova and Afandi, 2011).

Random Slope Multilevel Model

Random intercept models considers that the association between antisocial behaviour and individual level independent variables are the same for each neighbourhood which means that the slope β_{1j} in equation [5.5] is fixed across groups. However, in behavioural and social research, it is common for the effects of lower-level predictors to vary randomly across the higher level units (Raudenbush and Bryk, 2002). The constraint slope in random intercept model in equation [5.8] could be relaxed by allowing the slope to vary across neighbours, leading to a random slope model. In these random slope model, equation [5.7] and [5.8] become:

$$\beta_{1j} = \gamma_{10} + \mu_{1j} \quad [5.9]$$

$$Y_{ij} = \gamma_{00} + \gamma_{01}Z_j + \gamma_{10}X_{ij} + \mu_{1j}X_{ij} + \mu_{0j} + e_{ij} \quad [5.10]$$

In equation [5.10], γ_{00} , γ_{10} and γ_{1j} are fixed effects, while μ_{1j} , μ_{0j} and e_{ij} are random effects: μ_{0j} is the random effects of neighbourhood unit j on the intercept, e_{ij} is the individual level residual and $\mu_{1j}X_{ij}$ is an interaction term which allows every neighbourhood to have its own slope. In equation [5.10],

$$\text{Var}(\mu_{1j}) = \gamma_{11} \quad [5.11]$$

means unconditional variance in the level-1 independent variables. If the variance of the random effect in Equation [5.12], γ_{11} is non-zero, the neighbourhood level independent variables could be added to the model and cross-level interactions could be included to the random slop model that change equation [5.9] and [5.10] into:

$$\beta_{1j} = \gamma_{10} + \gamma_{11} + \mu_{1j} \quad [5.12]$$

$$Y_{ij} = \gamma_{00} + \gamma_{01}Z_j + \gamma_{10}X_{ij} + \gamma_{11} Z_jX_{ij} + \mu_{1j}X_{ij} + \mu_{0j} + e_{ij} \quad [5.13]$$

The term $\gamma_{11}Z_jX_{ij}$ is called the cross-level interactions or moderation effect and the neighbourhood level variable Z_j in the equation [5.13] operates as a moderation factor and the association between individual level explanatory variables and dependent variable varies according to the values of moderator variable (Hox, 2010).

Multilevel Poisson Regression Model⁸³

As described earlier, both count and categorical antisocial behaviour variables are employed as dependent variables. Consequently, Poisson and multinomial logistic regression models are adopted in the current study.

In the Poisson distribution, the probability of observing y event ($y=0,1,2,3 \dots$) is:

$$\Pr(y) = \frac{\exp(-\lambda)\lambda^y}{y!} \quad [5.14]$$

where \exp is the inverse of the natural logarithm. Just a single parameter, the event rate λ (lamda) exists in the Poisson distribution. “The mean and variance of the Poisson distribution are both equal to λ ” (Hox, 2010, p.151). Consequently, when the rate of events increases, the frequencies of the higher count also go up, which introduces heteroscedasticity. The independency of the events is an important assumption in the Poisson model.

The multilevel Poisson regression models take account of specific types of dependency (Hox, 2010). The Poisson model could be expanded by adding a varying exposure rate m (Hox et al., 2017). For example, when neighbourhoods do not have same number of young people, the distributions of antisocial behaviour would be Poisson with exposure rate the number of the young people in the neighbourhood. The exposure factor is included to the model, adding “a log transformation $\text{LN}(m)$ to put it on the same scale as the latent outcome variable η ” (Hox, 2010, p.152). The multilevel Poisson regression model can be written as:

$$Y_{ij}|\lambda_{ij} = \text{Poisson}(m_{ij}, \lambda_{ij}) \quad [5.15]$$

“The standard link function for the Poisson distribution is the logarithm” (Hox, 2010, p.152), and

$$\eta_{ij} = \log(\lambda_{ij}) \quad [5.16]$$

⁸³ The explanation on multilevel Poisson regression model is largely derived from Hox (2010) and Hox et al., (2017).

and for the multilevel Poisson model, random slope model in equation [5.12] becomes:

$$\eta_{ij} = \gamma_{00} + \gamma_{01}Z_j + \gamma_{10}X_{ij} + \gamma_{11}Z_jX_{ij} + \mu_{1j}X_{ij} + \mu_{0j} \quad [5.17]$$

Since the Poisson distribution has a single parameter, “specifying an expected count implies a specific variance. Thus, the first-level equations do not have a lowest level error term, e_{ij} ” (Hox, 2010, p.152-153).

Multilevel Multinomial Logistic Regression Model⁸⁴

Multilevel multinomial logistic regression model is adopted in measuring the relationship between categorical antisocial behaviour and level-1 and level-2 explanatory variables. Consider dependent variable y , “which takes values 1, 2, ... , C. We define response probabilities for each category k as

$$\Pr (y = k) = \pi^k$$

where

$$\pi_1 + \pi_2 + \dots + \pi_C = 1$$

One of the response categories is selected as the reference. Then the log-odds of being in one of the remaining categories rather than the reference category is modelled” (Steele, 2008b, p.3).

A single-level multinomial logistic regression model for the contrast between response category k and the reference category 1 for individual i ($i=1, \dots, n$) could be written:

$$\log \left(\frac{\pi_{ki}}{\pi_{1i}} \right) = \beta_{0k} + \beta_{1k}X_{i,} \quad k = 2, \dots, C \quad [5.18]$$

and when level 2 random effect is included in the model, the equation [5.17] becomes:

$$\log \left(\frac{\pi_{kji}}{\pi_{1ij}} \right) = \beta_{0k} + \beta_{1k}X_{ij,+} \quad k = 2, \dots, C \quad [5.19]$$

⁸⁴ The explanation on multilevel multinomial logistic regression model is largely derived from Steele (2008b).

Appendix 5.4 Ethical review and informed consent of the Millennium Cohort Study⁸⁵

Considerations are made to follow proper processes for ethical review and consent for the Millennium Cohort Study which was commissioned by the Economic and Social Research Council. Currently in the UK, the National Health Service Research Ethics Committee system is probably the most essential route for ethical approval for studies like the Millennium Cohort Study (Centre for Longitudinal Studies, 2014). The Multicentre Research Ethics Committee ethical approval (MREC) has been sought for all the Millennium Cohort Study follow-ups. Numerous steps are taken to assure the ethics of the study:

- “All respondents’ answers were treated in strict confidence regarding the Data Protection Act.
- Interviewers attended a briefing to make sure that everything that took place during an interview remained confidential.
- Information on ongoing support was provided to young people and parents in case they are influenced by any of the issues in the survey, for instance, the advance booklet for parents provided information regarding sources of professional support and helpline numbers.
- Interviewers were provided with guidelines on protecting both themselves and interviewees.
- Other than the thank you gift and the equipment needed to conduct the survey, cohort members were not to be provided anything else.
- For the other young person elements, a minimum requirement was for an adult to be nearby. However, if the interviewer, the parent or the young person was more comfortable with an adult being in the room, this approach was taken.
- Interviewers received consent from parents and cohort members to take part in the survey.
- Regardless of any consent or assent, the participants were allowed to refuse to participate in any element of a survey or withdraw from the study at any time by just presenting the wish to do so” (Ipsos MORI, 2016, p.43).
- Respondents were asked to provide written informed consent to participate in the survey themselves. For cohort members, parents were asked for their written consent to allow the interviewers to approach to the young person and ask for their consent to participate in the survey. The exception to this was the saliva sample collection, where parental consent for the child’s participation was legally required” (Ipsos MORI, 2016, p.51-52).

⁸⁵ The information on ‘ethical review and informed consent of the MCS’ in this section is mostly direct quotes from MCS Sixth Sweep Technical Report (Ipsos MORI, 2016) and MCS Ethical Review and Consent (Shepherd and Gilbert, 2019).

Appendix Chapter 6

Table A 7 Comparing conventional Poisson model and Zero Inflated Poisson model

Model	df	AIC	BIC	N
Poisson	13	76856	76944	6,220
Zero Inflated Poisson	14	76851	76946	6,220

Source: Sixth survey of the MCS (University of London et al., 2019) (author`s analysis, weighted)

Appendix Chapter 7

Table A 8 Testing for multicollinearity: Variance inflation factors (Model 3)

Independent Variables	VIF	1/VIF
<i>Socio demographic factors</i>		
Male	1.1	0.9
Ethnic minority	1.0	1.0
Low household income	1.9	0.5
Social housing	1.7	0.6
Single-parent household	1.3	0.8
<i>Behavioural factors</i>		
Illegal drugs	1.3	0.8
Victim of antisocial behaviour	1.2	0.9
High risk taking	1.1	0.9
Low bond with school	1.5	0.7
Drug taking friends	1.4	0.7
Friends with school trouble	1.3	0.8
Low parental supervision	1.4	0.7

Note: VIF (Variance Inflation Factor), VIF > 10 or 1/VIF <.1 considers having collinearity issue

Source: Sixth survey of the MCS (University of London et al., 2019) (author`s analysis, weighted)