

The impacts of stop and search on young people's mental health and involvement in crime

Secondary Data Project Analysis Plan

Evaluating institution: University of Manchester

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Analysis Plan for YEF Secondary Data Analysis Projects

Project summary

Project title	The impacts of stop and search on young people's mental health and involvement in crime
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Overarching research question	Does exposure to stop and search affect young people's mental health and criminal involvement?
Supporting research question(s)	• What are the short- <i>and</i> long-term effects of (i) cumulative neighbourhood exposure to stop and search and (ii) personal experiences of police stops during adolescence on young people's: - Mental health and wellbeing; - Involvement in crime and violence • Mediation: Do mental health harms mediate the relationship between policing exposure and later offending? • Moderation: Do short- and long-term effects differ across ethnic groups? • Generational differences: Are these effects consistent across different UK generations?
Dataset(s) to be used	Millennium Cohort Study (MCS; ages 11, 14, 17 and 23)

	Geocoded police stop and search records (2014-2017) UK Census 2011 English Indices of Deprivation (IMD; 2015) Small Area Mental Health Index (SAMHI; 2014-2017) 1970 British Cohort Study (BCS70)
Population characteristics	People born in England and Wales in 2000-02
Years data spans	2012 to 2023 • The main exposure period ranges from 2014 to 2017, when respondents were 14 through 17 years old • Outcomes were measured at ages 17 (2018) and 23 (2023) • Some individual-level covariates were measured at age 11 (2012)
Geographic coverage	England and Wales
Primary outcome(s) investigated (if relevant)	• Mental health and well-being • Criminal offending
Main method(s) to be used or tested	Marginal structural models with residual balancing Secondary methods include: • Longitudinal mediation models • Group-based trajectory models • Qualitative methods: semi-structured interviews and thematic analysis

Analysis plan history

Version	Date	Reason for revision
1.X [<i>latest</i>]		
1.1		
1.0 [<i>original</i>]	03.12	<i>[leave blank for the original version]</i>

Any changes to the design or methods need to be discussed with the YEF. Describe in the table above any agreed changes made to the design.

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1. About the project

1.1. Background to the project

Stop and search is intended to deter crime and promote safety. Not only can stops retrieve drugs and weapons and prevent crime from happening, but increased police activity on the streets can also be a deterrent tool for potential criminals. Yet, the widespread use of stop-and-search tactics can have social costs and unintended consequences. For example, adolescents repeatedly stopped by police officers or who reside in neighbourhoods where stop-and-search practices concentrate may be more likely to develop psychological distress and, as a consequence, get involved with criminal activity as adolescents or later in the life course. There is little causal evidence on long- term impacts of stop and search on mental health and crime outcomes amongst adolescents.

The harms of stop and search are not evenly distributed across the population. Extensive evidence - including from His Majesty's Inspectorate of Constabulary and Fire & Rescue Services (HMICFRS), College of Policing datasets, and the Lammy Review - documents persistent and substantial racial disproportionality in the frequency, intrusiveness, and consequences of stop and search in England and Wales. Black young people in particular experience stop and search at rates far exceeding those of White young people. This racialised pattern of policing is not merely incidental: it shapes who is most likely to be exposed, the cumulative stress burden of repeated encounters, and the psychological and social meanings attached to them. The current project therefore situates stop and search within longstanding debates about discriminatory and unequal application of police powers. While stop and search may be intended as a crime deterrence tool, empirical evidence on its deterrent effects is mixed and contested - particularly in relation to high-volume use. Critically, evidence on the harms of stop and search must be understood as structurally patterned, not incidental, and this framing is central to our analytical approach.

Detailed background

Stop and search powers are based on the premise that they deter crime by increasing the likelihood of detecting prohibited items (e.g. drugs and weapons) or enhancing police visibility in public spaces. Yet, the persistent use of such proactive policing practices may have unintended consequences. For instance, young people undergoing legal socialisation in a heavily policed environment—where they are subject to repeated police contact from an early age, or where police regularly stop their friends and neighbours—may develop a relationship with legal authority rooted in mistrust and cynicism (Fagan & Tyler, 2005). It is also important to note that legal socialisation processes may differ qualitatively across racialised and other groups. For communities that experience repeated, involuntary, and disproportionate police contact, encounters with legal authority may carry different meanings - shaped by historical and social context – than they do for those who encounter

police rarely, or in less negative ways. Exposure to coercive policing encounters, even when lawful, may therefore produce distinct psychological consequences depending on a young person's social position and the structural context in which those encounters occur or it may not; this is an empirical question that the present project will explore.

Determining the optimal level of stop and search activity—one that maximises crime deterrence while minimising social costs—remains a key policy, operational and research challenge (Manski & Nagin, 2017). Contributing to this agenda, we propose examining the potential life-course consequences of stop and search practices for youth socialised in over-policed environments across two key dimensions: mental health and offending behaviour.

Notably, existing evidence has already begun to inform practice: the Metropolitan Police Service (MPS; 2025) has acknowledged the potentially traumatic effect that stop and search can have on young people's mental health, and this recognition underpins current safeguarding requirements. Our project builds directly on this growing recognition, providing the robust evidence needed to strengthen such policy and practice commitments.

Specifically, our project will fill the following evidence gaps:

1. *Causal inference: short- and long-term effects of cumulative neighbourhood¹ exposure to stop and search and personal experiences of police stops*

Identifying effects of non-random exposures poses a significant methodological challenge, and the lack of causal evidence on the effects of youth exposure to stop and search is an important evidence gap. Our project will advance knowledge and address this gap by employing state-of-the-art methods for causal inference with panel data (Imai et al., 2023) involving with time-varying exposures and confounders (Zhou & Wodtke, 2020). We will draw on the potential outcomes framework and directed acyclic graphs to formally specify causal quantities of interest and the necessary assumptions to identify such effects. Analytically, we will use marginal structural models with residual balancing to estimate cumulative effects of neighbourhood exposure to stop and search during adolescence and personal experiences of police stops, while properly controlling for dynamic, time-varying confounders (e.g., repeated neighbourhood exposure to violent crime) without introducing overcontrol bias. We will also draw on recent advancements in causal mediation analysis with longitudinal data (Schomaker

¹ Neighbourhood-level measures capture the wider policing environment rather than individual exposure. We address ecological inference limitations by using both neighbourhood-level and individual-level (self-reported) exposure measures.

et al., 2019). Our study will offer more robust evidence on the life-course consequences of stop and search.

2. Effects of neighbourhood exposure to stop and search on youth mental health² and offending

While the Peterson et al. review (2023) identified some area-level crime reduction benefits of stop and search activity, it does not explore how neighbourhood exposure to these interventions affects the mental health of young people residing in those areas, or how such neighbourhood exposures interact with personal experiences with police stops during adolescence. Similarly, the possibility that stop-and-search practices may both deter or promote criminal activity has mostly been assessed using individual encounters with police. Our project will fill this gap by linking longitudinal survey data from one national cohort study (the MCS) with geocoded stop and search data to examine how growing up in a heavily policed environment influences youth mental health and crime involvement in early adulthood.

3. Longitudinal mediation: estimating indirect effects using causal mediation analysis

Stop and search experiences during adolescence can be chronic stressors that provoke emotional responses and psychological damage, leading to mental health harm (Kyprianides & Bradford, 2024). They can also foster legal cynicism (Oliveira, 2025), undermine trust and legitimacy (Bradford, 2017), or boost positive attitudes towards self-help violence (Tankebe, 2009)—all of which contribute to increasing youth propensity to engage in offending behaviour. While we assess the effects of neighbourhood exposure to stop and search and personal experiences of police stops during adolescence (as well as their interaction) on both mental health and offending behaviour separately, as two outcomes that occur in parallel, we also examine whether poor mental health transmits the effects of stop and search onto subsequent offending. Our intention is therefore to treat both mental health and criminal offending as primary outcomes, as they represent parallel and substantively important domains potentially affected by stop and search during adolescence. In addition to examining these outcomes separately, we will conduct an additional, explicitly framed mediation analysis to assess whether poor mental health transmits the effects of stop and search onto subsequent offending. This treatment-mediator-outcome pathway is tested using modern methods in causal mediation analysis (Imai et al., 2010), including recent advancements in causal mediation analysis with longitudinal data (Zhang & Wang, 2025; Zhou & Wodtke,

² It is important to emphasise that mental health harms are understood throughout this project as outcomes of structural exposure to policing - not as individual deficits or inherent characteristics of affected groups. This framing avoids pathologising young people who have been harmed by over-policing and situates mental health deterioration within its structural cause.

2020). While the identification of point estimates of indirect effects with non-random exposures involves strong assumptions, this project will provide bounded estimates which permit assessing the degree to which the claim that youth mental health mediates the effects of stop and search on subsequent offending has empirical validity.

4. Moderators: examining generational trends and ethnic differences

Previous studies have not adequately explored how life-course consequences of stop and search for mental health and crime involvement differ between White citizens and members of ethnic minority groups. Through the inclusion of interaction terms between exposures and ethnicity in our marginal structural models, our project will investigate whether short- and long-term effects of neighbourhood exposure to stop and search and personal experiences of police stops during adolescence are heterogeneous. Our analyses of effect heterogeneity by ethnicity are intended to be hypothesis-driven but will necessarily be interpreted cautiously. While the study is powered primarily to estimate overall effects, we will assess heterogeneity using interaction terms and report these results as exploratory where statistical power is limited. In addition, our project will leverage various data sources housed by the UCL Centre for Longitudinal Studies (CLS), primarily the 1970 British Cohort Study (BCS) and the MCS, to analyse trends across generations and socio-political contexts. This will provide insight into whether the association between experiencing police stops during adolescence and changes in mental health and propensity to criminally offend have changed over time.

Any observed differences in effects across ethnic groups will be interpreted in relation to differential exposure to policing and broader structural conditions - including neighbourhood deprivation, historical patterns of urban inequality, and racialised enforcement practices - rather than as reflecting individual or cultural differences between groups. Furthermore, research emphasises that the impact of heavy policing can be transmitted intergenerationally: mistrust of the police and its psychological consequences can endure across generations regardless of direct personal experience (Ben-Menachem & Torrats-Espinosa, 2024), as a result of collective memory and family socialisation in over-policed communities (Weitzer & Brunson, 2011). Our generational comparisons will therefore be interpreted with awareness of these intergenerational dynamics, and we will avoid characterising differences as purely individual or attributable to changes in attitudes alone.

The key audiences for our project include:

1. Policymakers and government bodies

Our findings will help policymakers to better assess the trade-offs with stop and search, particularly balancing potential area-level crime reduction benefits with individual-level costs.

The evidence would likely inform general revisions to legal guidelines (e.g., PACE Code A) on safeguarding and use of potentially less harmful strategies like problem-oriented policing. It could also be used to develop bids for the 2029/30 spending review to fund services - such as targeted youth mental health support, trauma-informed interventions, and diversionary programmes - that mitigate the adverse effects stop and search may have on mental health and offending among young people, and which could hamper the police in helping the Government in achieving its commitment in its Safer Streets Mission to halve knife crime.

2. Police and criminal justice sector agencies

As the College of Policing is a project partner, we have a clear pathway for our research to underpin changes to operational policing standards and the national policing curriculum. These changes, based on a better understanding of the neighbourhood- and individual-level impacts of stop and search, will likely direct police forces to adopt trauma-informed approaches, introduce more robust safeguarding arrangements, and improve officer skills to better manage interactions with children and young people. The College's working relationship with His Majesty's Inspectorate of Constabulary will mean forces will be assessed against these changes. College engagement with police and crime commissioners about the research may also affect how they hold chief constables to account and which services they commission.

3. Youth advocacy organisations and mental health practitioners

Via the College, the evidence produced by our research can be used by community scrutiny panels in their oversight of the use of stop and search in forces. For example, our findings could be translated into updated evidence summaries, training materials and practice guidance, which community scrutiny panels could use to benchmark local stop and search activity, interpret disproportionality and outcome data, and assess whether forces' practices align with evidence-based standards and safeguarding principles. It will also be a valuable resource to advocates for the mental health needs of young people affected by policing practices. Practitioners can design targeted interventions to support young people exposed to stop and search activities.

4. Academics and researchers

By filling the gaps identified in the Peterson review (Peterson et al., 2023) – particularly the limited attention to the mental health impact of neighbourhood-level exposure to stop-and-search practices on young people, the interaction between neighbourhood exposure and personal police encounters during adolescence, and the predominant focus on individual rather than area-level effects of offending -, our project will contribute to the broader evidence base on policing strategies, inspiring further research into youth-centric policing and its long-term societal impacts.

Equity statement: This project is explicitly designed to address structural racial harms. Stop and search in England and Wales has a well-documented racialised history and contemporary pattern: Black people are stopped at rates many times higher than White people, and this disproportion has persisted despite decades of policy reform. Policy recommendations arising from this work will consider both effectiveness and equity implications, and will be communicated in ways that support - rather than inadvertently reinforce - anti-racist policing reform. Dissemination will include affected communities and youth organisations, not only policymakers and criminal justice stakeholders.

1.2. Research Aim

This project examines whether and how exposure to stop and search (S&S) during adolescence—both through personal encounters and through growing up in heavily policed neighbourhoods—affects young people’s mental health and involvement in crime. It aims to produce robust, policy-relevant evidence about how exposure to police during adolescence affects young people both during adolescence and in early adulthood. The research will explore whether negative impacts on mental health help to explain any link between police contact and later offending, and whether these effects vary between different ethnic groups. Specifically, it seeks to answer the research questions laid out below.

1.3. Research question(s)

Primary research question (RQ1): Does exposure to stop and search affect young people’s mental health and criminal involvement?

This research question involves two exposures of interest (i.e., cumulative neighbourhood exposure to stop and search during adolescence and personal experiences of police stops during adolescence) and two outcomes of interest (i.e., young people’s mental health and involvement in crime) measured at two different periods (i.e., late adolescence and early adulthood). Therefore, it can be unpacked in the following two questions:

- RQ1.a) Does exposure to stop and search between ages 14 and 17 affect respondents’ mental health in late adolescence and/ or early adulthood?
- RQ1.b) Does exposure to stop and search between ages 14 and 17 affect respondents’ offending behaviour in late adolescence and/ or early adulthood?
- RQ1.c) Does the effect of personal experiences of police stops on mental health and offending vary according to the level of neighbourhood exposure to stop and search during adolescence?

Note on scope: This study examines the harms of stop and search irrespective of the legality or procedural correctness of individual stops. This is an important clarification for policy interpretation: even legally justified uses of police powers can produce unequal impacts across racialised groups, and a lawful stop may still be experienced as intrusive, stigmatising, or harmful. Our analysis therefore does not restrict attention to stops that may have been unlawful or procedurally deficient; rather, it examines the cumulative effects of exposure to stop and search practices as experienced.

Secondary research question (RQ2): Do mental health harms *mediate* the effects of youth exposure to stop and search on criminal involvement?

The secondary research question, related to the identification of indirect effects, can be unpacked in the following questions:

- RQ2.a) Do mental health harms mediate the effects of cumulative neighbourhood exposure to stop and search between ages 14 and 17 on respondents offending behaviour in late adolescence?
- RQ2.b) Do mental health harms mediate the effects of personal experiences of police stops between ages 14 and 17 on respondents offending behaviour in late adolescence?
- RQ2.c) Do mental health harms mediate the effects of cumulative neighbourhood exposure to stop and search between ages 14 and 17 on respondents offending behaviour in early adulthood?
- RQ2.d) Do mental health harms mediate the effects of personal experiences of police stops between ages 14 and 17 on respondents offending behaviour in early adulthood?

In addition, some follow-up research questions that logically stem from the main research question include:

- RQ3) Do short-term and cumulative effects of youth (neighbourhood and personal) exposure to policing on mental health and offending differ across ethnic groups?
- RQ4) Is the association between personal experiences with police stops during adolescence and mental health/offending behaviour consistent across different generations?

We include RQ3 because a central aim of this project is to establish whether and how these effects differ across racialised groups, treating equity as a primary analytical lens and not a secondary consideration. In examining ethnic-group differences, the analysis will treat ethnicity not as a proxy for inherent cultural differences, but as a socially and institutionally constructed category that shapes—and is shaped by—racialised policing practices and broader structural inequalities. The analysis will test whether observed differences reflect racialised exposure, differential treatment, and structural disadvantage. The research does not essentialise ethnic groups but examines how racism and discriminatory policing practices drive differential outcomes.

RQ4 is motivated by an important gap in the literature: we do not know whether the association between police contact during adolescence and subsequent mental health and offending outcomes has changed over time, as policing practices, legislation, and social attitudes have shifted considerably between the 1970s and the 2000s. For policymakers, evidence on generational trends would help establish whether recent reforms to stop and

search practice have altered its psychological and behavioural consequences, and whether findings from earlier decades remain relevant to contemporary policing. For youth advocacy organisations and mental health practitioners, understanding whether the harms of stop and search have intensified or lessened across generations can help calibrate the urgency and targeting of support services. For researchers, generational comparisons can help distinguish stable psychosocial mechanisms from historically contingent effects.

Table 1.2. How will the questions be addressed at each stage?

Question Number	Interim report	Final report
RQ1	- Variable construction and descriptive statistics: neighbourhood exposure to stop and search between ages 14 and 17 - Descriptive statistics: mental health and offending behaviour in late adolescence and early adulthood. - Check consistency and attrition bias across sweeps (Sweeps 6, 7 and 8). - Linking MCS data with stop and search data - Variable construction and descriptive statistics: personal experiences of police stops between ages 14 and 17 - Definition of key time-stable and time-varying confounders - Linking MCS data with other sources (police-recorded crimes, UK Census, SAMHI, IMD) - Descriptive statistics of key time-stable and time-varying confounders - Construction of weights using residual balancing (to handle time-varying confounders; weights will be subsequently included in marginal structural models)	- Full results of RQ1.a , RQ1.b and RQ1.c - Sensitivity analyses and robustness checks.
RQ2	- RQ2 will only be addressed after RQ1 (i.e., considering outcomes in late adolescence, measured through the publicly available MCS seventh sweep, and then through the	- Following the completion of RQ1.a, RQ1.b and RQ1.c, full results of RQ2.a, RQ2.b., RQ2.c and RQ2.d.

	now publicly available eight sweep) is complete. Therefore, it will not be addressed at the Interim Report.	- Integration of qualitative findings to contextualise mechanisms and lived experiences.
RQ3	- RQ3 will only be addressed after RQ1 (i.e., considering outcomes in late adolescence, measured through the publicly available MCS seventh sweep, and then through the now publicly available eight sweep) is complete. Therefore, it will not be addressed at the Interim Report.	- Following completion of RQ1.a, RQ1.b and RQ1.c, results for RQ3 considering outcomes measured in late adolescence (i.e., MCS seventh sweep) and early adulthood (i.e., MCS eighth sweep). - Integration of qualitative findings to contextualise mechanisms and lived experiences.
RQ4	- Variable construction and descriptive statistics: Millennium Cohort Study - Variable construction and descriptive statistics: British Cohort Study - Preliminary results: trajectory models of arrest and mental health.	- Full results of RQ4

1.4. Hypotheses

Our project is guided by a set of testable hypotheses about how exposure to stop and search affects young people's mental health and their involvement in crime. These hypotheses draw on prior research, established theories in criminology, sociology and psychology, and the mechanisms outlined in our conceptual framework³. We state them in clear, accessible terms below.

Primary Research Question

RQ1. Does exposure to stop and search affect young people's mental health and criminal involvement?

Hypothesis 1: Exposure to stop and search increases young people's propensity to criminally offend

Expected direction: We expect that the prevalence of stop-and-search activity in young people's neighbourhood of residence during their adolescence, as well as their personal

³ We have covered these in the 'background' section above.

experiences of being repeatedly stopped by the police, increases their propensity to engage in offending behaviour. We expect that such effects are visible both in late adolescence and in early adulthood.

Rationale / prior evidence: This hypothesis addresses Research Questions RQ1.b and RQ1.c. Previous studies have consistently shown that police contact, particularly early exposures to policing, can foster rather than deter criminal offending among individuals (Kyprianides et al., 2025; McAra and McVie, 2010). For example, previous studies from the United States and Latin America highlight that adolescents with experiences of involuntary police stops are more likely to engage in offending behaviour (Wiley et al., 2013), that adolescents who witness or hear about episodes of police violence are more likely to criminally offend (Oliveira and Jackson, 2025), and that adults who spent their adolescence in neighbourhoods characterised by abusive policing are more likely to engage in violent behaviour (Oliveira et al., 2025). Our hypothesis is that, in England and Wales, adolescents with repeated experiences of involuntary of police stops and growing up in over-policed neighbourhoods will also be more likely to criminally offend—during their adolescence and in early adulthood.

It is important to acknowledge that exposure to policing is not evenly distributed across populations. In the UK context, racialised groups - particularly Black communities - experience disproportionately high levels of police contact. This means that the mechanisms described below operate within a landscape of racialised surveillance, and that the psychological and behavioural consequences of policing are likely to be concentrated among groups that already face structural disadvantage.

Mechanisms: Several mechanisms have been theorised to explain how and why early exposure to policing fosters criminal behaviour. For example, (i) procedural justice theory posits that direct and vicarious contacts with police consist of teachable moments in which people update their expectations about legal institutions and the law (Tyler et al., 2014), and this process is particularly prominent during childhood and adolescence (Tyler and Trinkner, 2017). When people have repeated unjust and intrusive experiences with police, their social bonds with legal authority weakens, loosening internal constraints against rule violating behaviour. We note that for communities experiencing disproportionate surveillance or historically discriminatory treatment, perceptions of injustice may reflect structural inequalities rather than simply the quality of individual-level encounters. Procedural justice theory should therefore be understood in this structural context: where police contact is systematically more frequent and more coercive for certain racialised groups, eroded trust and legitimacy represent responses to patterned institutional behaviour, not merely individual-level experiences.

Similarly, (ii) legal cynicism theory indicates that the over-policing of neighbourhoods and citizens can foster a culture of cynicism towards police capacity and interests in solving community problems and towards social norms about collective moral rules, propelling some individuals towards violence (Kirk and Papachristos, 2011). Race equity scholarship situates legal cynicism within broader structural conditions (Sampson & Bartusch, 1998; Kirk & Papachristos, 2011; Bell, 2017): in contexts characterised by concentrated policing alongside social and economic disinvestment, distrust in legal institutions may be a rational, historically grounded response to institutional experiences and inequalities, rather than an individual attitudinal deficit or pathology. Our analysis will interpret legal cynicism as a structural outcome, not an individual pathology.

In addition, (iii) the labelling approach suggests that when people are repeatedly stopped by the police—when they repeatedly receive the message from legal agents that they are suspects of criminal activity—they can internalise a criminal self-identity, thus developing a higher propensity to engage in offending behaviour (Wiley et al., 2013). The labelling mechanism is further shaped by the racialisation of suspicion: where stop practices disproportionately target certain racial groups, repeated police contact may reinforce broader societal narratives that link race and criminality, thereby amplifying labelling effects for racialised young people beyond what individual encounter quality alone would predict.

Finally, (iv) general strain theory (Agnew, 1992) argues that intrusive encounters with police, particularly during adolescence, can act as stressors with long-term mental health consequences. Cumulative exposure to policing can provoke feelings of anger, frustration and fear, thus increasing the likelihood of anti-social behaviour and externalising behaviour, including delinquency (Kyprianides et al., 2025). Repeated police encounters may function as a chronic stressor that is unevenly distributed across racial groups due to well-documented disparities in policing exposure. General strain theory therefore has particular salience for understanding the experiences of Black young people and some other minority ethnic groups – including young people from Mixed ethnic backgrounds -, who are disproportionately subjected to repeated police encounters.

Hypothesis 2: Exposure to stop and search harms young people's mental health

Expected direction: We expect that the prevalence of stop-and-search activity in young people's neighbourhood of residence during their adolescence, as well as their personal experiences of being repeatedly stopped by the police, will contribute to worsen people's mental health and wellbeing outcomes in adolescence and early adulthood. This includes higher levels of anxiety, psychological distress, and lower self-esteem.

Rationale / prior evidence: This hypothesis addresses Research Questions RQ1.a and RQ1.c. Research suggests that individuals, particularly young people, with recent experiences of

aggressive policing tend to develop mental health problems (Geller et al., 2014; Jackson et al., 2021). This is true both for personal experiences of involuntary police stops and vicarious exposure to events involving of police use-of-force (Oppenheim et al., 2024). Outcomes include anxiety, depression and post-traumatic stress disorder, as well as psychological distress, suicidal ideation and other mental health challenges (McLeod et al., 2019).

Mechanisms: As indicated above, general strain theory (Agnew, 1992) suggests that crime occurs as a result of individuals' inability to cope with stress or strain. Life stressors can trigger negative emotions, most notably anger. Our hypothesis is grounded on the theorized mechanism through which repeated experiences of police stops and cumulative neighbourhood exposure to stop and search during adolescence can act as stressors, triggering negative emotions including anger, frustration and fear. Adolescence is a sensitive developmental period in which such life stressors can have lasting impacts on wellbeing.

Counter-mechanisms: We acknowledge that alternative mechanisms may also be operative. First, increased stop and search activity may deter crime in some contexts, potentially reducing young people's exposure to violence and criminal networks, and thus lowering their propensity to offend. Second, a visible police presence may - for some residents - enhance perceptions of community safety and thereby support mental wellbeing (see Hypothesis 2 below). Our analyses are designed to detect effects in either direction, and we present these as competing hypotheses to be tested rather than assuming a priori that effects will be harmful. Sensitivity analyses and subgroup comparisons will help assess whether positive and negative effects operate differentially across contexts and groups.

Secondary Research Question

RQ2. Do mental health harms *mediate* the effects of youth exposure to stop and search on criminal involvement?

Hypothesis 3: Exposure to stop and search increases young people's propensity to criminally offend through mental health harms

Expected direction: Hypothesis 3 essentially consists of the combination of hypotheses 1 and 2. If they are supported, we also hypothesise that mental health harms *transmits* some of the effects of personal experiences of police stops and cumulative neighbourhood exposure to stop and search during adolescence onto greater propensities to engage in criminal offending. We expect positive indirect effects.

Rationale / prior evidence: As before. Not only do we expect personal experiences of police stops and cumulative neighbourhood exposure to stop and search during adolescence to have negative effects on mental health indicators and positive effects on propensity to criminally offend, both in late adolescence and early adulthood, but we know also expect mental health

to act as a mediator. Previous evidence suggests that early exposure to policing can impact mental health (Geller et al., 2014; Jackson et al., 2021) and that mental health harms can lead to criminal involvement (Link et al., 2016), but to our knowledge indirect effects have not been estimated.

Mechanisms: As before. We expect personal experiences of police stops and cumulative neighbourhood exposure to stop and search during adolescence to act as life stressors, triggering negative emotions and undermining mental health indicators. Such emotional strains can then foster involvement in crime.

1.5. Key concepts

This project examines how different forms of exposure to stop and search shape young people's mental health and involvement in crime as they move from adolescence into adulthood. Below we define all key concepts central to our research questions and analyses. These are conceptual definitions only; section 3 sets out the exact variables and measures used to operationalise each construct. Where definitions may require refinement during the interim stage (e.g., based on data release or feasibility testing), we indicate this.

Description of the exposure: stop and search in England and Wales

Stop and search is a statutory policing power that allows police officers to stop individuals in public places and search them for prohibited items, such as weapons, drugs, or stolen property. The main legal bases are set out in the Police and Criminal Evidence Act 1984 (PACE, Code A), the Misuse of Drugs Act 1971, and the Criminal Justice and Public Order Act 1994. Under most powers, officers must have "reasonable grounds" for suspicion based on objective factors; under specific authorisations (e.g. section 60 of the Criminal Justice and Public Order Act), searches may be conducted without individualised reasonable suspicion within a defined area and time period. While the legal framework requires objective grounds for suspicion, there is substantial evidence that this standard is applied unevenly in practice (Dawson et al., 2026). Race equity scholarship highlights how discretionary powers can reproduce racialised patterns of suspicion and surveillance, including the possibility that Black individuals are more likely to be stopped than others with comparable characteristics. However, the extent and mechanisms of these disparities – whether operating through individual encounters, area-level patterns, or both – remain empirical questions that this study will examine rather than assume in advance.

A standard stop and search interaction typically involves an officer stopping an individual, explaining the legal power being used, the grounds for the search, and what they are looking for, followed by a physical search of outer clothing and belongings. Individuals are not required to answer questions beyond providing basic identifying details, and a written record

of the search should be provided. If no prohibited items are found, the individual is released. If prohibited items are found, possible outcomes include seizure of items, arrest, caution, or referral to other criminal justice processes. These encounters may be more intrusive or distressing encounters where individuals may experience repeated searches, use of force, or searches are conducted in highly visible public settings. The experience and meaning of stop and search may also differ substantially across social groups. For individuals in communities subject to frequent and concentrated policing, encounters form part of a broader pattern of surveillance and repeated contact - one that may carry cumulative psychological weight beyond the impact of any single encounter. This contextual dimension is central to understanding why effects may be stronger for some groups than others.

It is important to distinguish between stop and search and other, less intrusive forms of police-initiated encounters. Stop and search involves a physical search under a specific statutory power and is among the most intrusive forms of routine police contact. By contrast, police may also stop individuals without conducting a search—for example to ask questions, seek information, or account for their presence or behaviour. These encounters do not involve a physical search and are generally less intrusive, though they may still be experienced as coercive or distressing.

It is important to note that the MCS measure used in this project, "have you ever been stopped by the police?", covers more than just stop and search. Respondents may have had the experience of being stopped by police (and therefore answer 'yes') but not of a stop and search, that is, they may have just been stopped but not searched. It is important to note that if we assume the search component of police encounters is more harmful than the stop alone, our analysis is likely to underestimate the effect of stop and search.

Police in England and Wales do not have a legal power to stop someone simply to ask them questions or conduct an ID check, but it is clear that this is indeed what happens in many situations. Such interactions are often called 'stop and account', and between 2005 and 2011 police were required to record stop and accounts in the same way they record stop and search. In 2008/09 there were 2.2 million stop and accounts, compared with 1.5 million stop and searches. It seems like the number of police stops (account and search) will still exceed the number of stop and searches by some margin. However, the available data for this study do not allow us to reliably distinguish between these forms of police encounter, meaning that analyses will capture exposure to police stops more broadly.

Exposure to police stops is not randomly distributed. Selection mechanisms include neighbourhood-level factors (e.g. local crime rates, deprivation, and policing intensity), individual-level characteristics (e.g. age, gender, ethnicity, prior police contact, and behavioural cues perceived as "suspicious"), peer groups (the company young people keep,

association with individuals already known to police), and situational factors (e.g. time of day, location, and police deployment strategies). These mechanisms contribute to clustering of stop and search among young people living in deprived and higher-policing areas, which is central to our causal framework.

These spatial patterns of concentrated policing frequently intersect with historical patterns of urban inequality, reflecting longstanding structural processes that have concentrated disadvantaged and racialised communities in areas subject to more intensive policing. Neighbourhood-level policing exposure should therefore be understood not only as a product of local crime rates, but also as reflecting broader race and class-based patterns in the distribution of state power. Race equity perspectives (Shiner et al., 2018; Vomfell & Stewart, 2021) emphasise that ethnic disparities in stop rates may reflect racialised and discriminatory enforcement patterns, rather than inherent behavioural differences in behaviour between groups.

Table 1.5 Definitions of key concepts

Terms	Definition used
Personal experience of police stops during adolescence	Direct personal experience of being stopped and questioned by the police during adolescence, including whether the encounter occurred, its timing, and whether it happened repeatedly. This concept captures the experience of being subjected to police suspicion or surveillance.
Cumulative neighbourhood exposure to stop and search⁴	The level of stop and search activity in a young person's residential area, capturing the wider policing environment even for those not personally stopped. Defined conceptually as the local intensity of S&S during adolescence. So, this concept refers to growing up in a residential area where police use stop-and-search powers frequently. It reflects the local intensity of policing, including the cumulative number of recorded stop and search incidents in the neighbourhood

⁴ 'Cumulative exposure' can refer to both personal and neighbourhood exposure (though we will mostly refer to neighbourhood exposure due to data constraints, see methods section below), indicating the cumulative burden of repeated or chronic policing during adolescence. It reflects developmental science showing that repeated stressors can have stronger effects than isolated events.

	during adolescence. It captures the wider policing environment that may influence young people even if they are not personally stopped.
Psychological distress	Emotional strain such as anxiety, low mood, or persistent worry, representing a young person's perceived stress and emotional burden.
Mental wellbeing	Positive psychological functioning, including life satisfaction, optimism, and feelings of purpose or calm.
Internalising behaviours	Emotional difficulties directed inward, such as withdrawal, fearfulness, sadness, or low confidence.
Externalising behaviours	Outward-directed behavioural difficulties, including aggression, impulsivity, hyperactivity, or behavioural dysregulation.
Self-esteem	A young person's overall sense of self-worth and personal value.
Involvement in crime and violence	Engagement in antisocial, violent, or criminal behaviours during adolescence and early adulthood (e.g., theft, assault, weapon use, gang involvement). Individuals' arrest history can also indicate involvement in crime. Exact distinctions between violent and non-violent offending will be finalised during the interim stage once item distributions and model specifications are assessed.
Long-term effects	Impacts/ consequences observable several years after initial exposure to policing (e.g., adolescent exposure vs. outcomes at ages 17 and 23), including persistent effects on mental health and offending risk.
Moderation by ethnicity	The concept that the impact of stop and search may differ across ethnic groups. Categories may be collapsed at interim stage depending on sample sizes.
Mediation by mental health	"Mediation" refers to the hypothesised process by which mental health harms act as a pathway linking policing exposure to later offending. It does not mean that all effects must operate through mental health—only that this is one hypothesised mechanism.
Generational differences	This refers to whether relationships between police contact, mental health, and offending have changed across UK cohorts born in 1970 and 2000. The concept includes: historical changes in policing practices, changing social attitudes, differences in youth experiences across generations. Definitions will be further refined at the interim stage as we harmonise measures across cohorts.

Confounding factors	Characteristics that may influence both exposure to policing and outcomes, including early-life psychological and behavioural traits (e.g., low self-control, impulsivity, aggressiveness, adjustment difficulties), socioeconomic circumstances, neighbourhood deprivation, local crime rates, and demographic factors. For example, individuals with low self-control and other psychological traits may be more likely to engage in crime and to being stopped by the police. Similarly, children growing up in socioeconomically disadvantaged families are more likely to live in deprived and higher-crime neighbourhoods with greater use of stop and search, while the same family and individual characteristics are also associated with poorer mental health and a higher propensity to offend, thereby confounding the relationship between policing exposure and later outcomes.
Violent and non-violent offending	This will be clarified during the interim stage, based on distributions and modelling. Conceptually refers to behaviours intended to cause harm (e.g., assault, use of weapons). Operational distinctions between categories will be outlined in the interim report.

Planned refinements during the interim stage

During the interim analysis, we expect to refine:

- the grouping or collapsing of ethnic categories for moderation analysis (conditional on sample size and statistical power);
- the generational comparison framework after harmonising BCS70 and MCS measures;
- potentially, distinctions between types of offending (violent vs. non-violent) based on item structures and model diagnostics. Specifically, we will assess the distributions of all offending items available in MCS Sweeps 7 and 8 to determine whether sufficient variance exists to support separate violent and non-violent indices. Violent offending will provisionally be operationalised as behaviours involving physical force or threat thereof (e.g. assault, weapon use, gang involvement), while non-violent offending will capture property crime and other rule-breaking (e.g. theft, vandalism). Where item distributions are too sparse to support separate indices, we will use a composite delinquency score as the primary outcome, with violent and non-violent sub-scores reported descriptively.

These refinements will not change the conceptual definitions above—they only clarify operationalisation.

In addition to outlining the key concepts, we also describe the underlying causal mechanisms and the broader conceptual framework that guides our analysis. This provides clarity on how the different elements of the study fit together, the pathways through which stop and search may influence outcomes, and the assumptions that shape our empirical strategy.

Conceptual Framework

We distinguish between:

- Contemporaneous effects: short-term effects following neighbourhood or personal exposures to stop and search on mental health and criminal offending during adolescence.
- Long-term effects: enduring consequences observable in early adulthood.

The research draws on the potential outcomes framework to specify the causal quantities of interest and uses directed acyclic graphs (DAGs) to identify plausible confounders, mediators, and colliders. A draft of the DAG illustrating the conceptual framework is provided in Appendix 1. This will be refined/finalised at interim if needed (and caveated as such).

Given the observational design and the lack of exogenous shocks, causal identification relies on a selection-on-observables approach. Unobserved time-stable heterogeneity can only be assumed away, that is, estimates can only be interpreted causally under the assumption that all potential confounders have been accounted for in the model. This is a strong assumption. The richness of the Millennium Cohort Study allows us to control for a wide range of potential confounders, given that it contains data from respondents' entire life courses covering several social, psychological, biological, and intergenerational domains, including important time-constant confounders measured before adolescence, prior to personal and neighbourhood exposure to policing during adolescence. Crucially

In addition to relying on a rich set of time-stable confounders measured during childhood, a crucial challenge when estimating cumulative effects of a time-varying exposure variable on a distal outcome consists of appropriately adjusting for time-varying confounders. Because cumulative effects, by definition, consist of a time-varying exposure, the dynamic relationship between time-varying exposures and confounders introduces new sources of bias. Not controlling for a time-varying confounder introduces confounding bias, whereas naïvely controlling for it introduces over-control bias—as the time-varying confounder is also a mediator over time. To handle time-varying confounders, we will rely on recently developed methods to estimate weights using residual balancing in the context of marginal structural models.

A concrete example illustrates this challenge: neighbourhood crime rates are likely both a confounder (higher crime rates drive more intensive policing AND independently predict

mental health problems and offending) and a mediator (policing itself may affect subsequent crime rates). Simply controlling for crime rates at each time point would therefore simultaneously address confounding and introduce overcontrol bias. Our approach - marginal structural models with residual balancing weights - is specifically designed to handle this dynamic by weighting observations to create a pseudo-population in which time-varying confounders (including neighbourhood crime rates) no longer predict subsequent exposure. See Figure A3 in Appendix 1 for the DAG illustrating this time-varying confounder structure.

2. About the datasets

2.1. Overview of datasets used

This project brings together several rich and complementary data sources to understand how stop and search affects young people's mental health and involvement in crime. All of the data relate to England and Wales, where stop and search records and youth longitudinal studies are consistently available.

Millennium Cohort Study (MCS)

The core dataset is the Millennium Cohort Study (MCS), a large national study that has followed around 19,000 children born in the UK in 2000–2002. It provides detailed information about young people's backgrounds, wellbeing, and behaviour from early childhood into early adulthood. For this project, we will focus on the period when cohort members were aged 14, 17 and 23. The MCS includes self-reported experiences of being stopped by the police, detailed mental health measures, and self-reported offending. It also includes residential histories, which allow us to link each young person to the policing environment of their neighbourhood.

Geocoded stop and search data

To capture local policing activity, we will link the MCS to geocoded stop and search data from all police forces in England and Wales, obtained from the police.uk open data portal. While these data provide national coverage, their reliability depends on administrative recording practices, which are known to vary across police forces. At some level, these data are likely to represent an undercount of stop and search encounters, and it is probable that some forces record stops more consistently or accurately than others. We therefore treat the stop and search data as an imperfect proxy for local policing intensity rather than a complete record of all encounters. To account for systematic differences in recording practices and policing regimes across forces, our analyses will include police force area (PFA) fixed effects. These absorb time-invariant differences between forces, including persistent variation in recording quality, enforcement styles, and organisational practices. We acknowledge that the stop-and-search exposure measure may be affected both by under-recording of police encounters and

by the inability of available data to fully capture the broader range of police stops that constitute the underlying exposure of interest. In fixed-effects models, such measurement error is likely to produce attenuation bias (that is, bias estimates towards zero). In our case, this is a particular concern because recording practices vary across police force areas (PFAs). We address this in two ways. First, we include PFA fixed effects to absorb systematic time-invariant differences in recording quality between forces. Second, we will estimate equivalent models using PFA random effects and compare estimates - substantial differences between fixed and random effects specifications would indicate sensitivity to this modelling choice and will be reported transparently. Remaining limitations—such as under-recording, within-force variation over time, and imprecision in geocoded locations—will be acknowledged and explored through sensitivity analyses.

An important additional limitation of administrative stop and search data is that under-recording and misclassification of ethnicity may be patterned. Forces subject to greater race equity scrutiny tend to record encounters more accurately; others may systematically under-record stops of certain groups (Fitzgerald & Sibbitt, 1997). Additionally, officer perception-based classification of ethnicity, missing demographic data, and variations in geocoding precision may all introduce racialised measurement error. We will conduct sensitivity analyses excluding records with missing or ambiguous ethnicity data, examine force-level variation in recording completeness, and interpret disproportionality ratios cautiously, avoiding assumptions that recorded rates directly represent behavioural differences between groups.

These records cover the years 2014–17, when MCS participants were on average 14 through 17 years old. From official stop and search records, we will compute a measure of the total count of stops by Lower Super Output Area (LSOA) by year. We will then draw on MCS respondents' residential history from 2014–17 and link stop and search data by LSOA. This will allow us to have a measure of the amount of stop and search activity recorded in respondents' LSOA of residence in each year from 2014 through 2017. Residential histories in the MCS Secure Access files are recorded at each survey wave rather than annually. This means that for participants who moved between waves, we have residential addresses at ages 14 (Wave 6, 2015) and 17 (Wave 7, 2018) but not for the intervening years (ages 15 and 16). For individuals whose residence differs between waves 6 and 7, we will assign LSOA of residence based on the wave 6 address for years 2014-15, and the wave 7 address for years 2016-17. This is an approximation that may introduce some measurement error in the cumulative exposure variable for movers; we will conduct a robustness check restricting the sample to residential stayers (those with the same LSOA at both waves) to assess the impact of this assumption. We anticipate that residential mobility is modest in this age group and that this simplification will not substantially alter main findings.

2.2. Secondary data source(s)

Other linked data sources

We will also link in several neighbourhood-level datasets to provide additional context about each young person's environment. These include local crime rates, deprivation scores (Index of Multiple Deprivation; IMD), Census information (demographic and socio-economic characteristics), and neighbourhood mental health indicators (Small Area Mental Health Index; SAMHI) by LSOA. These sources help us understand whether the impacts of policing differ depending on local area characteristics.

Other cohort studies

Finally, to explore how the effects of police contact may have changed over time, we will draw on earlier UK cohort studies—most importantly the 1970 British Cohort Study (BCS70). This study follows a generation of children born in 1970 and includes measures of police contact, mental health, and offending during adolescence and adulthood. While the measures are not identical to those in the MCS, harmonising the datasets allows us to explore generational differences in how young people experience policing.

For the generational analysis, two additional CLS datasets were considered for use:

- 1958 National Child Development Study (NCDS)
- 1989/90 Next Steps (formerly LSYPE)

The team has already accessed and downloaded all three datasets from the UK Data Service. However, our initial review indicates that a robust analysis will need to centre on the BCS70, as the other two cohorts include only limited measures relevant to this study. A key reason for focusing exclusively on the BCS70 is that it provides far richer and more direct measures of early police contact than the other cohort studies. In Next Steps (1990 cohort), there are no questions capturing adolescents' own experiences with the police. The earliest self-reported measure of police contact does not appear until age 25. During adolescence (ages 14–17), only *parents* are asked whether they have been contacted by police because of something their child did, and at age 18 the sole relevant item is an attitudinal statement about perceived over-policing of young people—useful, but not a behavioural measure. Similarly, the NCDS (1958 cohort) contains only a single *parent*-reported item at age 16 asking whether the child “has been in trouble with the police,” which is far too limited for any nuanced analysis of adolescent police exposure or its developmental consequences. In contrast, the BCS70 (1970 cohort) offers a substantially more detailed set of variables on police contact throughout adolescence, along with rich attitudinal measures in adulthood. This depth allows for more rigorous and conceptually aligned analyses. Our team has already begun exploring these data—preliminary findings on adolescent police contact and adult legal cynicism were presented at the American Society of Criminology conference in November

2025—and the richness of the BCS70 continues to make it the strongest and most appropriate dataset for this line of inquiry.

The rationale for including BCS70 as a generational comparison is to examine whether the psychological and behavioural consequences of police contact during adolescence have changed across different socio-political eras of policing in England and Wales. The 1970s and early 1980s saw very different stop and search practices, legislation (pre-PACE), and public debate about discriminatory policing than the 2000s and 2010s. Comparing associations between police contact, mental health, and offending across these cohorts therefore provides insight into whether reforms and increased scrutiny of stop and search have altered its developmental consequences - evidence that is directly relevant to current debates about the value of further reform.

Taken together, these datasets provide a unique combination of individual-level, neighbourhood-level, and generational data that allow us to study not only whether stop and search affects young people, but also how and why these effects occur.

Table 2.2a Dataset Description – *Millenium Cohort Study (MCS)*

Name of dataset	Millennium Cohort Study (MCS)
Data owner(s)	Centre for Longitudinal Studies (CLS), UCL
Type of data	Longitudinal cohort study
Availability of data	Available via the UK Data Service (End User Licence), with additional restricted-access residential and geocoded data available under Special Licence
Team member(s) who will have access	Dr Thiago Oliveira, Dr Arabella Kyprianides, Prof Ben Bradford, Dr Paul Quinton, Senior Statistical Officer
Population/geographic coverage or sampling frame	Nationally representative cohort of ~19,000 children born in the UK in 2000–2002, with coverage across England, Wales, Scotland, and Northern Ireland. Analyses will focus on those residing in England and Wales during adolescence
Years covered or survey waves	6 (age 14, 2015), 7 (age 17, 2018), and 8 (age 22–23). Additional earlier waves (e.g., Wave 5 at age 11) used for confounders
Exclusion criteria	Participants without valid residential history for linkage; those not residing in England or Wales during adolescence;

	cases with inconsistent police-stop responses (to be handled via data cleaning)
Expected population/sample size (following exclusion criteria)⁵	Approx. 10,000 cohort members after exclusions (final number to be confirmed in interim report once Wave 8 has been included: Wave 8 total sample is 9,735. The expected analytic sample after applying exclusion criteria will be lower than this; a revised estimate will be confirmed in the interim report once linkage and exclusion steps have been applied. ⁶)
Documentation	https://cls.ucl.ac.uk/cls-studies/millennium-cohort-study/ (codebooks, questionnaires, user guides)

Table 2.2b Dataset Description – *Geocoded stop and search data*

Name of dataset	Police Stop and Search Records (all forces in England and Wales)
Data owner(s)	Individual territorial police forces; aggregated and published via police.uk
Type of data	Administrative, incident-level, geocoded policing data
Availability of data	Open data, publicly downloadable from police.uk archives
Team member(s) who will have access	Dr Thiago Oliveira, Dr Arabella Kyprianides, Prof Ben Bradford, Dr Paul Quinton, Senior Statistical Officer
Population/geographic coverage or sampling frame	All stop and search incidents recorded by police forces in England and Wales; counts by LSOA by year.
Years covered or survey waves	2014–2017 (aligned to MCS participants aged ~14–17). Some forces may have incomplete geographic coverage; this will be documented at interim stage ⁷

⁵ This may not be known at this stage of the project. Please provide your best estimate or range based on your knowledge of the dataset.

⁶ The Wave 8 total sample is 9,735 participants. After applying exclusion criteria (residence in England and Wales, valid LSOA linkage, at least one valid outcome measure), the expected analytic sample is approximately 7,500-9,000 participants. This revised estimate will be confirmed in the interim report.

⁷ Police stop-and-search counts from the preceding 12 months will be linked to each MCS wave (e.g., 2014 police activity linked to the 2015 age-14 wave), covering the period 2014–2017 for participants aged approximately 14–17. A 12-month exposure window was selected to capture sustained neighbourhood policing exposure while maintaining temporal proximity to the outcome measures and consistency across waves. Sensitivity analyses will explore alternative

Exclusion criteria	Incidents outside England and Wales; records without valid geocodes; duplicates or missing key fields (handled through cleaning)
Expected population/sample size (following exclusion criteria)	Approximately 1.5–2 million S&S records across the four-year period (final number dependent on data completeness)
Documentation	https://data.police.uk/about/stop-and-search/

Table 2.2c Dataset Description – *Neighbourhood Contextual Data (Census, IMD, Crime, SAMHI)*

Name of dataset	Neighbourhood Contextual Datasets (Census 2011/2021; Index of Multiple Deprivation; Police-recorded crime; Small Area Mental Health Index)
Data owner(s)	Office for National Statistics (ONS); Ministry of Housing, Communities & Local Government (IMD); data.police.uk; Place-Based Longitudinal Data Resource (PLDR)
Type of data	Administrative and survey-based neighbourhood indicators
Availability of data	All datasets available as open data (SAMHI accessible through PLDR under licence)
Team member(s) who will have access	Dr Thiago Oliveira, Dr Arabella Kyprianides, Prof Ben Bradford, Dr Paul Quinton, Senior Statistical Officer
Population/geographic coverage or sampling frame	England and Wales; aggregated to Lower Super Output Area (LSOA) level, matched to MCS residential histories
Years covered or survey waves	Census 2011/2021; IMD 2019; Police-recorded crime (2014–2017); SAMHI annual indices (2015–2018)
Exclusion criteria	LSOAs outside England and Wales; areas without matched MCS residential data; incomplete SAMHI coverage (noted in interim report)
Expected population/sample size (following exclusion criteria)	There are approximately 32,000 LSOAs in England and Wales, and we estimate that approximately 10,000–12,000 MCS participants reside across these LSOAs.
Documentation	Census: https://www.ons.gov.uk/census

exposure windows where feasible. Some police forces may have incomplete geographic coverage; this will be documented at the interim stage.

	IMD: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019 Crime: https://data.police.uk/ SAMHI: https://pldr.org/
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Table 2.2d Dataset Description – 1970 British Cohort Study (BCS70)

Name of dataset	1970 British Cohort Study (BCS70)
Data owner(s)	Centre for Longitudinal Studies (CLS), UCL
Type of data	Longitudinal cohort study
Availability of data	Available via UK Data Service (End User Licence and Special Licence components)
Team member(s) who will have access	Dr Thiago Oliveira, Dr Arabella Kyprianides, Prof Ben Bradford, Dr Paul Quinton, Senior Statistical Officer
Population/geographic coverage or sampling frame	Cohort of individuals born in a single week of 1970 across the UK. Analyses will focus on England and Wales due to alignment with policing data context
Years covered or survey waves	Adolescent waves (age 16) and adult waves (age 30s–40s), depending on availability of police contact, mental health, and arrest indicators. Exact waves will be confirmed during interim analysis once harmonisation work is complete
Exclusion criteria	Participants without police contact measures; those outside England & Wales for main comparison; missing key mental health or arrest indicators (to be refined during data harmonisation)
Expected population/sample size (following exclusion criteria)	Approximately 7,000–9,000 individuals with usable data (final N determined during harmonisation)
Documentation	https://cls.ucl.ac.uk/cls-studies/1970-british-cohort-study/

2.3. Primary data collection (delete if not collected)

This project will include a small amount of primary data collection in the form of qualitative interviews with young people. These interviews will complement the secondary data analysis

by helping us understand the mechanisms and lived experiences behind the statistical patterns observed in the quantitative work.

Population and sampling

We will conduct 15–20 semi-structured interviews with young people aged 18–24, including both individuals who experienced stop and search between the ages of 10 and 17 and those who did not. Participants will be recruited through partner organisations including youth charities, community groups, and mental health organisations. Recruitment will aim to achieve a diverse sample in terms of ethnicity, gender, and geographic area within England and Wales, reflecting groups most affected by stop and search. Sampling will be purposive, focusing on individuals with direct experience of policing during adolescence.

Sampling will be purposive and will explicitly prioritise adequate representation of racialised groups disproportionately affected by stop and search - particularly Black and mixed Black young people. This is not merely a matter of demographic diversity: because racialised groups experience qualitatively different policing encounters, their perspectives are essential for understanding the mechanisms under investigation. The qualitative component will explicitly explore racialised interpretations of policing encounters, including experiences of profiling, stereotyping, and racialised fear or stigma. Recruitment through trusted community intermediaries will be prioritised to mitigate the risk that individuals with negative policing experiences - who may be less likely to engage with research associated with institutions - are underrepresented.

Method of data collection and consent

Interviews will be conducted either in person or via secure video call, depending on participant preference and safeguarding considerations. Each interview will last approximately 45 minutes and follow a semi-structured topic guide exploring experiences of stop and search, emotional and psychological impact, perceptions of fairness and legitimacy, coping strategies, and suggestions for improving police practice.

Recounting police encounters may be distressing or re-traumatising, particularly for racialised or marginalised participants. Interviews will therefore follow trauma-informed principles throughout: interviewers will be trained in trauma-informed practice; participants will be reminded at the outset and throughout that they may skip any question and stop at any time; a debrief protocol will be followed at the close of each interview; and contact details for relevant support services (including mental health charities and youth organisations) will be provided to all participants before and after the interview.

All participants will be provided with an information sheet and will give informed consent prior to the interview. Interviews will be audio-recorded (with consent), transcribed verbatim,

anonymised, and stored securely in accordance with ethical approvals and data protection guidelines.

Data linking and integration with secondary sources

The qualitative data will not be linked to any individual-level secondary data sources or administrative datasets.

Administrative stop and search data are shaped by recording practices that may vary by force, locality, and officer discretion. Ethnic disproportionality in recorded stop and search may reflect: differential policing intensity across neighbourhoods; variations in recording compliance; officer perception-based classification of ethnicity; differences in geocoding precision; and missing or inconsistently recorded demographic data. These factors may affect both the magnitude and interpretation of disproportionality estimates. To mitigate risks of biased interpretation, the analysis will conduct sensitivity analyses excluding records with missing or ambiguous ethnicity data, examine force-level variation in recording completeness, and interpret disproportionality ratios cautiously. Findings will be framed within the broader structural context of policing deployment and recording practices.

No identifying information from participants will be combined with the Millennium Cohort Study or any other dataset. Instead, the qualitative findings will be used to contextualise and interpret the secondary data results through a mixed-methods integration approach.

Specifically, qualitative themes will help to:

- explain mechanisms that cannot be directly measured in surveys (e.g., feelings of stigma or legitimacy),
- provide insight into subgroup differences (e.g., by ethnicity), and
- interpret any unexpected or ambiguous statistical findings.

Because no participant-level linking will occur, there are no data linkage risks associated with the primary data collection.

2.4. Linking datasets (delete if not collected)

This project involves extensive linking of secondary datasets at both the individual and neighbourhood levels. No primary qualitative data will be linked to secondary datasets.

Data flow and linkage structure

The linkage process has two main stages:

1. Individual-level linkage within the Millennium Cohort Study (MCS)

- CLS provides MCS respondents' residential histories under Special Licence. Residential addresses in the MCS Secure Access files are geocoded to LSOA at each survey wave, not annually. For the exposure period 2014-17, we therefore have LSOAs from Wave 6 (age 14, 2015) and Wave 7 (age 17, 2018). For years between waves, residential LSOA will be carried forward from the most recent available wave. Participants who move between waves will be assigned to their Wave 6 LSOA for 2014-15 and their Wave 7 LSOA for 2016-17. This approximation may introduce measurement error in cumulative neighbourhood exposure for movers; a robustness check restricting to residential stayers will assess the sensitivity of results to this assumption.
- These addresses are already geocoded by CLS to Lower Super Output Areas (LSOAs).
- Individual-level survey responses (police contact, mental health, offending, demographics, early-life measures) are therefore linked internally by a secure, pseudonymised cohort ID.

2. Neighbourhood-level linkage to external datasets

Using each respondent's LSOA of residence during adolescence, we will link:

- geocoded stop and search data,
- police-recorded crime,
- Index of Multiple Deprivation (IMD),
- Census socioeconomic indicators,
- SAMHI neighbourhood mental health scores.

This is a straightforward geographic join—no personal identifiers are shared, and linking occurs at the area level.

2.5. Access and data protection

This project involves the use of several secondary datasets (MCS, BCS70, Police.uk stop and search data, Census, IMD, crime data, SAMHI) and a small amount of qualitative primary data. All data access, processing, and storage will comply with GDPR, the Data Protection Act 2018, UKRI/HEI research governance protocols, and the specific requirements of the data owners.

Degree of data sensitivity

The datasets vary in their sensitivity:

- MCS, BCS70 and other CLS datasets (Special Licence):

These contain personal data as defined by the ICO (e.g., demographic characteristics, health information, behavioural indicators) and include special category data such as ethnicity and mental health measures. Residential LSOA identifiers in the Special Licence files further increase sensitivity.

- Police.uk stop and search data; Census; IMD; crime data:

These are open, aggregate, or de-identified datasets. They do not include directly identifiable personal data.

- SAMHI:

Area-level mental health indicators (no personal data).

- Qualitative interviews:

Audio and transcripts constitute personal data; some participants may share information relating to special category data (e.g., mental health).

No raw administrative records containing identifiable personal information (e.g., names, full addresses) will be accessed at any point.

Legal basis for processing (GDPR Article 6 and Article 9)

The project's legal basis for processing data is:

- Article 6(1)(e) GDPR – processing is necessary for the performance of a task carried out in the public interest, specifically academic research.
- Article 9(2)(j) GDPR – processing of special category data is permitted where necessary for scientific or historical research purposes, subject to appropriate safeguards.

These bases are standard for UK academic research using CLS data.

For qualitative interviews, informed consent is also obtained from participants. However, consent is not relied upon as the GDPR legal basis; it is an ethical requirement.

GDPR compliance and protection of data subjects' rights

Compliance will be ensured through:

- Data minimisation: Only variables required for analysis will be extracted.
- Pseudonymisation: All CLS data are pseudonymised by CLS before access. Qualitative transcripts will be fully anonymised.
- Secure storage: All data will be stored on the University of Manchester and UCL secure servers, compliant with ISO27001 standards, with encrypted access and institutional VPN requirements.
- Restricted access: Only named team members approved by CLS/UKDS will have access.
- Safeguards for special category data: Access to Special Licence datasets (e.g., MCS residential histories) requires Safe Researcher accreditation and signed data security agreements.

- Right to erasure and withdrawal: For qualitative interviews, participants can withdraw prior to anonymisation. For secondary data (CLS datasets), data subjects' rights are managed by the original data controller (CLS).
- Purpose limitation: Data will be used solely for this project and for no secondary purposes.
- Retention and destruction: Data will be held only for the duration of the project plus the minimum period required for auditability, after which it will be securely destroyed in accordance with UKDS and institutional requirements.

Data processing roles

- Data Controllers:
 - Secondary data: The Centre for Longitudinal Studies (CLS), Office for National Statistics (ONS), PLDR, and Police.uk remain controllers of their respective datasets.
 - Primary qualitative data: The University of Manchester (lead institution) will act as Data Controller.
- Data Processor:
 - The research team processes data under the terms set by each Data Controller and institutional governance.

There are no external processors.

Process for obtaining data access

- CLS datasets (MCS and BCS70): Access is obtained via the UK Data Service (UKDS)
 - The project draws on several components of the Millennium Cohort Study (MCS). The core survey sweeps—Age 11 (Sweep 5, 2012), Age 14 (Sweep 6, 2015), and Age 17 (Sweep 7, 2018)—were accessed through the standard UK Data Service application process and do not require Safe Researcher accreditation, as they are available under the standard End User Licence. In addition, the project uses a set of Secure Access MCS datasets that contain sensitive information, including detailed demographic, health, socio-economic, and geographical identifier files (Sweeps 1–7) and the Sweep 5–7 LSOA-level geographical identifiers based on 2011 Census boundaries. These datasets required a formal Special Licence application and are only accessible within the UKDS SecureLab environment. Dr Arabella Kyprianides has completed Safe Researcher training and currently has full SecureLab access to all MCS Secure Access datasets. Dr Thiago Oliveira is in the process of completing the accreditation and approval steps needed to access the same files. Only approved researchers will handle these data, and all analysis will be conducted within the secure environment.
 - Dr Thiago Oliveira has already obtained access to the BCS70, which was accessed through the standard UK Data Service application process and does not require Safe Researcher accreditation.

- Police.uk, Census, IMD, crime data:
 - These datasets are open access; no permissions are required.
- SAMHI:
 - These datasets are open access; no permissions are required.
- Qualitative data:
 - Will be collected directly by the research team following ethics approval from UCL and University of Manchester.

No dataset will be transferred outside secure institutional environments.

Environment for data analysis and security safeguards

All quantitative analyses will be conducted on secure institutional servers:

- Access controlled by university credentials and two-factor authentication
- Encrypted data storage compliant with ISO27001
- No data downloaded to personal devices
- No cloud storage outside university-managed systems
- Outputs checked to avoid disclosure of small cells or identifiable combinations

Qualitative interview recordings will be stored on encrypted drives on secure servers and deleted once transcribed. Transcripts will be fully anonymised before analysis.

Training undertaken by team members

All team members accessing Special Licence data will have:

- UKDS Safe Researcher Training and Accreditation
- Institutional GDPR and data protection training
- Training on handling special category data and safeguarding procedures
- Additional internal training provided by CLS where required

Interviewers will also receive training in secure data handling, confidentiality, and managing sensitive disclosures.

Data owner requirements

We will comply with all relevant data owner stipulations, including:

- CLS requirements for confidentiality, disclosure control, and secure environments
- UKDS Special Licence terms
- ONS licensing requirements for Census data reuse
- Institutional ethics requirements for primary qualitative data collection

No attempts will be made to link CLS datasets to identifiable external data sources

Data retention and destruction

- Secondary datasets:
 - Data will be retained for the duration of the project and destroyed within the period required by UKDS licence terms (typically at project end or when access agreements expire).
- Qualitative data:
 - Audio files deleted immediately after transcription and quality checking
 - De-identified transcripts may be retained for archiving if permitted by participants and ethics approval; otherwise destroyed at project end

All destruction will use secure deletion methods compliant with ISO27001.

2.6. Ethics

Ethical approval has already been obtained from UCL's Research Ethics Committee for the central quantitative component of the project, including analysis of the Millennium Cohort Study and linked secondary datasets (Project ID 1208). As these datasets were collected under prior ethical approval by the original data owners and are accessed in de-identified or pseudonymised form, no additional ethics review is required for their secondary analysis. A separate ethics application has been submitted to UCL for the qualitative interview component, which involves primary data collection with young people aged 18–24 who experienced stop and search during adolescence. This application is currently under review, and approval is expected prior to commencing recruitment. No primary data collection will take place until ethical approval has been granted.

3. Methods

3.1. Research design

Table 3.1: Research design

Research design		Secondary data analysis of longitudinal survey data. Quantitative longitudinal design. Longitudinal cohort study following the lives of 19,000 young people born across the UK in 2000-02. Eight sweeps of data collection to date, from infancy to age 23.
Dataset(s) used		Millennium Cohort Study (Sweeps 5–8), police.uk stop and search data, neighbourhood context datasets (Census 2011/2021, IMD, police crime records, SAMHI), and BCS70 for generational comparisons.
Population of interest		Young people living in England and Wales who participated in the MCS, observed between ages 11–23. Additional analyses include adults in BCS70 for generational comparisons.
Size of sample population		Approx. 10,000–12,000 MCS participants after exclusions; ~7,000–9,000 for BCS70 comparison analyses (exact Ns to be confirmed at interim stage).
Stratification variable (s) (if applicable)		Primary stratification/moderation analysis by ethnicity; additional stratification by gender and deprivation levels explored in sensitivity analyses.
Exposure	Variable	(1) Personal experiences of police stops during adolescence; (2) Cumulative neighbourhood exposure to stop and search during adolescence
	Measure (instrument, scale, source)	(1) Self-reported experience of being stopped and questioned, from MCS survey questions at ages 14 and 17. (2) Total count of recorded S&S incidents in respondents' residential LSOA (2014–2017; police.uk data).
Primary outcome	Variable	(1) Mental health and wellbeing; (2) Involvement in crime and violence.
	Measure (instrument, scale, source)	(1) Psychological distress, wellbeing, internalising / externalising behaviours, and self-esteem (MCS age 14–23 survey instruments). (2) Offending measures include violent and non-violent behaviours such as weapon carrying, assault, theft, or gang involvement (self-report scales; final operationalisation refined at interim stage). Arrest history.
Covariates/ confounders	Variable(s)	(1) Demographic (2) Socioeconomic (3) Neighbourhood-level (4) Early psychological and behavioural variables predictors of offending behaviour
	Measure(s) (instrument, scale, source)	(1) Sex, ethnicity; MCS survey (2) household income, parental education, family structure; MCS survey (3) IMD scores, crime rates, ethnic diversity, SAMHI scores (4) Self-control, emotional regulation,

		impulsivity, aggressiveness, and social adjustment measured in earlier MCS waves (age 10)
Mediators/ Moderators	Variable(s)	(1) Mental health (mediator) (2) Ethnicity (moderator)
	Measure(s) (instrument, scale, source)	(1) Mental health indicators at age 17 (MCS survey) (2) Self-reported ethnicity (MCS survey)
Main method(s) to be used or tested		Marginal structural models with residual balancing will be used to estimate cumulative effects of time-varying exposures while accounting for time-varying confounders. In addition, longitudinal mediation models based on the causal mediation analysis framework. Secondarily, group-based trajectory models.

This project uses linked secondary datasets to test whether exposure to stop and search during adolescence has short- and long-term effects on young people's mental health and involvement in criminal or violent behaviour.

Design and population

The primary study population is the Millennium Cohort Study (MCS), focusing on young people followed through ages 11, 14, 17, and 23 living in England and Wales. Their individual survey responses are linked to detailed neighbourhood-level policing data, allowing us to measure both personal experiences of police stops and neighbourhood exposure to stop and search during adolescence.

To investigate generational differences, analyses will be compared with equivalent measures in the 1970 British Cohort Study (BCS70).

Outcomes

Outcomes include:

1. Mental health and wellbeing
 - a. psychological distress
 - b. mental wellbeing
 - c. internalising and externalising symptoms
 - d. self-esteem
2. Involvement in crime and violence
 - a. violent and non-violent offending behaviours (self-report)
 - b. arrest history

Data management and missingness

All data will undergo consistency checks, harmonisation of variable coding across waves, and imputation of missing values using multiple imputation by chained equations. Sensitivity analyses will assess the impact of alternative imputation models.

Proposed project

Our design includes three core studies, informed by an initial phase of descriptive and preliminary analyses. These are described in Section 3.5, *Research methods and analysis*.

3.2. Participants

This study draws on participants from two large, nationally representative UK birth cohort studies, supplemented by qualitative interviews with young people who have experienced stop and search. Each component has distinct inclusion and exclusion criteria, described below.

Quantitative participants (Millennium Cohort Study)

The primary analytic sample is drawn from the Millennium Cohort Study (MCS), comprising around 19,000 children born in 2000–2002 across the UK. For this project, we focus on:

- Young people living in England and Wales during adolescence,
- With valid data on police contact, mental health, offending, and residential history at ages 11, 14, 17, and 23.

Inclusion criteria:

- Participation in MCS Sweeps 5, 6, and 7 (ages 11, 14, 17).
- Residence in England or Wales during adolescence (to enable linkage to policing data).
- Valid residential LSOA identifiers for neighbourhood linkage.
- Availability of at least one mental health or offending measure across waves.

Exclusion criteria:

- Participants living outside England and Wales during key exposure periods.
- Missing or invalid residential history data needed for linkage.
- Cases with inconsistencies or unusable responses in the stop and search measures (resolved during data cleaning).

Expected sample size: Approximately 10,000–12,000 young people after applying inclusion/exclusion criteria.

Subgroup sample sizes by ethnicity will be reported transparently in the interim report. This is particularly important where ethnic categories are collapsed: where sample sizes are too small to support disaggregated analysis, we will report this limitation explicitly and exercise caution in interpreting any group-level comparisons.

Generational comparison participants (British Cohort Study 1970)

A secondary sample is drawn from the 1970 British Cohort Study (BCS70). This group includes adults who experienced adolescence in the mid-1980s, enabling generational comparison of policing impacts.

Inclusion criteria:

- Participation in adolescent and early-adulthood waves that include measures of police contact, mental health, and offending.
- Residence in England or Wales.

Expected sample size: Approximately 7,000–9,000, subject to final harmonisation work.

Qualitative interview participants

To enrich understanding of mechanisms, we will conduct 15–20 semi-structured interviews with young people aged 18–24 who experienced stop and search during adolescence.

Inclusion criteria:

- Aged 18–24.
- At least one experience of stop and search between ages 10–17 OR young people grew up in an area with high stop and search activity, but who may not have been personally stopped and searched.⁸
- Able to provide informed consent.
- Living in England or Wales.

Exclusion criteria:

- Under 18 (to avoid interviewing minors).
- Individuals unable to consent or for whom participation would pose unacceptable risk (assessed during screening).

Recruitment will aim to include participants from a range of ethnic backgrounds and from different regions of England and Wales, reflecting populations most affected by stop and search. Interviews will be conducted in community settings or online, depending on participant preference.

Race Equity Considerations in Interview Design

⁸ Two interview schedules are provided in the Appendix to accommodate these two groups.

The interview schedule has been reviewed through a race equity lens to ensure that questions do not individualise experiences of stop and search or implicitly frame disproportionality as behavioural rather than structural. Questions were designed to:

- Avoid deficit framing or assumptions about criminality
- Allow participants to identify structural, racial or institutional factors where relevant
- Capture intersectional dynamics (race, gender, age, locality)
- Enable participants to describe both individual encounters and wider community experiences

The schedule includes prompts that explicitly invite reflection on differential treatment across groups, anticipatory behaviour, and perceptions of collective rather than purely individual targeting. This reduces the risk of privileging narratives aligned with dominant institutional perspectives. During analysis, attention will be paid to within-group variation to avoid flattening racial or ethnic experiences into monolithic categories. Particular care will be taken to ensure that narratives of harm or mistrust are not reframed as attitudinal deficits but understood within structural and historical context.

3.3. Variables and measurement

The tables below describe how each key concept (as defined in Section 1.5) will be operationalised using the available data. Where final measurement decisions depend on feasibility or data completeness, this is explicitly noted for assessment at the interim stage.

Table 3.3 Measurement of key concepts: Exposure variables

Concept	How the concept will be measured and encoded	Variable source, definition and derivation or specification	Analysis required at interim stage to test assumptions
Personal experience with police stops during adolescence	Self-reported experience of being stopped and questioned. Binary indicator: 1 = respondent stopped by police; 0 = no stop reported	MCS Wave 6–7 (ages 14–17) self-report items: “Have you ever been stopped and questioned by the police?”	Assess item consistency across sweeps; evaluate missingness; check feasibility of cumulative coding.
Cumulative neighbourhood exposure to stop and search	Continuous variable representing total number of S&S records in the respondent’s residential LSOA between ages 14–17.	Police.uk S&S geocoded data (2014–2017). Linked to MCS using residential LSOA identifiers (Secure	Evaluate linkage completeness; decide appropriate coding (continuous vs. categorical);

		Access). Aggregated counts per LSOA per year, matched to age-specific exposure windows.	test stability of area-level rates; assess sensitivity to geocoding suppression or fuzzed locations.
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Table 3.3 Measurement of key concepts: Outcome variables

	Concept	How the concept will be measured and encoded	Variable source, definition and derivation or specification	Analysis required at interim stage to test assumptions
Mental health ⁹	Psychological distress	Continuous scale score; also explored dichotomously using clinical thresholds where available.	MCS Kessler-6 questionnaire, which assessed emotional well-being over the past 30 days at ages 14, 17, 23. Standardised (z-scores) for comparability.	Confirm instrument availability at each sweep; assess internal reliability; test measurement equivalence across waves.
	Mental wellbeing	Continuous wellbeing scale; standardised.	MCS YP Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS), which measures positive psychological functioning through 14 positively worded items rated on a 5-point Likert scale.	Confirm scale construction; check dimensionality; harmonise across waves.

⁹ The specific mental health outcome used for the security rating assessment will be finalised at the interim stage. This decision will be informed by data quality, outcome prevalence, patterns of missingness, and the distributional properties of the measures across waves, to ensure that the selected outcome provides the most robust and informative basis for disclosure risk assessment and statistical modelling.

	Internalising behaviours	Continuous SDQ subscale scores (emotional problems).	MCS emotional symptoms and peer problems subscales of the Strengths and Difficulties Questionnaire (SDQ). Emotional symptoms capture anxiety, depression, and distress, while peer problems assess social difficulties.	Assess age comparability; missingness patterns; potential Rasch modelling.
	Externalising behaviours	Continuous SDQ conduct/hyperactivity subscales.	MCS conduct problems and hyperactivity/inattention subscales of the SDQ. Conduct problems reflect rule-breaking and aggression, while hyperactivity/inattention captures impulsivity and attention issues.	Same as above; examine skewness; evaluate use of categorical cut-offs.
	Self-esteem	Continuous score from MCS self-esteem items (age 14 and 17).	MCS Young Person (YP) Shortened Rosenberg Self-Esteem Scale	Assess consistency; determine if age 23 measure is available; test latent factor structure.
	Depression/ anxiety	Binary (age 17; yes/ no)	MCS depression or anxiety clinical diagnosis (age 17)	
Offending/ violence	Involvement in crime and violence	Binary (any offence) and continuous (count of behaviours) depending on distribution; separate variables for violent vs non-violent offending; arrest history.	MCS self-reported offending items: theft, assault, weapon carrying, gang involvement, vandalism, etc. Derived into: (a) violent offending index; (b) non-violent offending	Confirm availability at ages 14, 17, 23; use Rasch or IRT modelling to examine scale structure; assess sparsity

			index; (c) composite delinquency score. ¹⁰	in violent items; decide final categorisation at interim stage.
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Table 3.3 Measurement of key concepts: Moderators, mediators, generational variables, and qualitative measures

Concept	How the concept will be measured and encoded	Variable source, definition and derivation or specification	Analysis required at interim stage to test assumptions
Ethnicity (moderator)	Categorical variable using standard ONS categories; may be collapsed into broader groups (e.g., White, Black, Asian, Mixed, Other) depending on power. ¹¹	MCS ethnicity variables.	Assess cell sizes; determine feasible category structure for interaction models; ensure consistency across waves.
Mental health as mediator	Continuous mediator variables: distress, wellbeing, internalising/externalising scales (as specified in above table 'Outcomes'). Used in causal	MCS mental health measures at ages 14 & 17 as mediators (as specified in above table 'Outcomes').	Verify timing alignment (exposure → mediator → outcome)

¹⁰ This approach is commonly used in the criminological and developmental psychology literature to summarise multidimensional offending behaviours (see e.g. Kyprianides et al., 2025).

¹¹ Collapsing ethnicity into broad categories (e.g. White, Black, Asian) may obscure meaningful within-group differences and mask specific inequalities. For example, experiences of policing may differ substantially between Black Caribbean and Black African young people, and between those of mixed Black heritage and other groups. We will therefore: (a) retain disaggregated ONS categories wherever sample size permits; (b) conduct sensitivity analyses using more granular categories where possible; (c) apply a principled, pre-specified aggregation scheme when collapsing is necessary, with transparent justification; and (d) handle mixed ethnicity categories with particular care, acknowledging that experiences of policing may not align neatly with broad racial groupings. We will avoid inferring group-level conclusions from aggregated categories without acknowledging the within-group heterogeneity that aggregation may conceal.

	mediation models (e.g., SEM or potential outcomes framework).		
Generational differences	Harmonised variables across cohorts: policing exposure, mental health, offending. Encoding determined by the degree of measurement overlap.	MCS & BCS70 datasets.	Assess feasibility of harmonisation; identify comparable constructs; test equivalence of scales or use coarser harmonised categories where required.
Qualitative measures	Perceptions of fairness, emotional impact, coping, trust, behavioural adaptations	Semi-structured interviews (n=15–20)	Thematic codes developed inductively and deductively
Area-level characteristics (moderator)	We will also include area-level characteristics to examine whether the meaning or impact of police presence differs across neighbourhood contexts. See precise measures in below table ‘Confounders’.		

Table 3.3 Measurement of key concepts: Confounders

Concept	How the concept will be measured and encoded	Variable source, definition and derivation or specification	Analysis required at interim stage to test assumptions
Early psychological/behavioural traits ¹²	Continuous SDQ or behavioural adjustment scales at earlier waves;	MCS Sweep 5 (age 11).	Confirm instrument; assess reliability; consider latent

¹² An important set of confounders consists of early psychological and behavioural characteristics that may influence both the likelihood of police contact and later mental health and offending. We therefore leverage the MCS to control for psychosocial variables measured in childhood, prior to adolescence, capturing early individual differences that could confound associations between stop and search exposure, mental health, and offending. In particular, we use measures of emotional regulation, impulsivity, and social adjustment collected in Sweep 5 (age 11), which includes all five SDQ subscales—emotional symptoms, conduct problems, hyperactivity/inattention, peer problems, and

	included as baseline covariates.		variable modelling.
Family socioeconomic context	Parental education, income, household structure, receipt of benefits; categorical and continuous as appropriate.	MCS demographic and socioeconomic modules.	Check missingness; standardise income measures; consider equivalised income.
Demographic characteristics	Age, gender, ethnicity (as confounder), migration background ¹³ .	MCS Wave 1–7.	Confirm variable consistency across waves.
Neighbourhood deprivation	Continuous IMD score; categorical quintiles.	IMD 2019 linked to LSOA. IMD 2025 which was recently released will also be considered.	Verify linkage
Neighbourhood mental health	Small Area Mental Health Index (SAMHI)	SAMHI linked to LSOA	Verify linkage

prosocial behaviour—providing coverage of constructs such as self-control, impulsivity, aggression, and internalising distress. These measures precede the adolescent outcome periods and are treated as baseline confounders in our models; although the personal stop-and-search measure captures lifetime experience up to the adolescent sweep, the SDQ captures stable pre-adolescent traits that are plausibly prior to, and predictive of, subsequent exposure patterns.

¹³ Migration background within and around the UK may interact with policing exposure in complex ways, including through differing prior experiences with authorities, local integration processes, and patterns of mobility. We will examine whether migration background moderates the association between policing exposure and outcomes through interaction terms, and will include this as a planned sensitivity analysis.

Neighbourhood ethnic diversity	Ethnic diversity ¹⁴	Census 2011 linked to LSOA	Verify linkage
Neighbourhood crime ¹⁵	Continuous crime rate per 1,000 population; by crime type.	Police-recorded crime data linked to LSOA.	Verify linkage; Assess stability of annual rates; handle missing values.
Parental mental health and household deprivation ¹⁶	Indicators of parental mental health (e.g. validated scale scores) and expanded household deprivation indices; categorical and continuous as appropriate.	MCS Sweep 5 (age 11); constructed as continuous or categorical indices and treated as time-varying covariates.	Assess scale validity and consistency across sweeps; construct composite deprivation index; examine missingness and temporal stability.

¹⁴ In research examining stop and search and related issues, it is typical for the ethnic composition of an area to be represented by: (a) the percentage of the population with a Black ethnicity (per cent Black), and (b) ethnic diversity as represented by measures such as Simpson's Index of Diversity, which provides a value that ranges between 0 and 1 for area, with higher values indicating greater diversity (see e.g. Kyprianides & Bardford, 2024). Simpson's Index of Diversity can be interpreted as the probability that any two individuals randomly selected from, here, an LSOA will belong to a different ethnic group (with 1 representing perfect diversity, where each individual is from a different group).

¹⁵ Importantly, high stop-and-search rates are not always proportional to underlying crime rates, and may instead reflect targeted enforcement in particular communities - often racialised ones - regardless of crime levels. Our analysis distinguishes between policing presence (stop and search intensity) and crime rates by including both as separate variables in the models. By controlling for local crime rates while estimating the effect of stop and search, we are able to assess whether policing exposure has effects above and beyond what would be predicted by the underlying crime environment. We will also conduct supplementary analyses examining the ratio of stop and search rates to crime rates as a measure of policing intensity relative to need.

¹⁶ There is strong evidence (e.g. Adjei et al., 2025) that parental mental health problems and severe household deprivation predict both children's mental health and their involvement with the criminal justice system, and may also be associated with residing in more heavily policed areas.

Educational attainment and special educational needs and disabilities (SEND) ¹⁷	Continuous KS2 attainment scores; categorical SEND status (e.g. none, SEN support, EHC plan).	National Pupil Database linked to MCS under Special Licence; KS2 records and SEND indicators.	Verify linkage; assess coverage and selection bias; standardise attainment scores; examine missingness.
Peer group characteristics ¹⁸	Measures of peers' behaviours and attitudes (e.g. deviance, school engagement); constructed as continuous or categorical indices and treated as time-varying covariates.	MCS Age 14 sweep (self-reported peer measures).	Assess internal consistency; consider index construction; examine distribution and missingness; test suitability as time-varying confounders in MSMs.

3.4. Sample size

The final sample size for the quantitative analyses will depend on the proportion of Millennium Cohort Study (MCS) participants who meet the inclusion criteria and can be successfully linked to neighbourhood policing data. Based on previous waves and expected linkage success, we anticipate the following:

Millennium Cohort Study (primary analysis sample)

¹⁷ KS2 attainment scores are highly predictive of later offending outcomes, and SEND pupils are disproportionately recorded as offenders. Failure to control for these factors risks confounding associations between policing exposure and offending.

¹⁸ Peer group composition and norms are known to influence both offending behaviour and the likelihood of police stops.

After applying inclusion criteria (residence in England or Wales during adolescence, valid residential LSOA linkage, and at least one measure of police exposure, mental health, or offending), we expect a final analytic sample of approximately 10,000 young people¹⁹.

This range reflects:

- Normal attrition between MCS Sweeps 5, 6, 7 and 8
- Expected high completeness of residential LSOA identifiers
- Anticipated 90–95% successful linkage with police.uk stop and search data

Final sample size will be confirmed in the interim report, when Wave 8 data (age 23) and linkage completeness can be assessed directly.

BCS70 (generational comparison sample)

For the 1970 British Cohort Study (BCS70), we expect 7,000–9,000 participants will have usable measures on police contact, mental health, and offending, after excluding those outside England and Wales and cases with missing key variables. The exact number will depend on the outcome of harmonisation work during the interim stage.

Qualitative interview sample

The qualitative component will include 15–20 young people aged 18–24 who have personal experience of stop and search during adolescence. This sample is designed to support thematic depth rather than statistical representativeness.

Interim-stage verification

At the interim stage, we will:

- Confirm the proportion of MCS participants with complete exposure, outcome, and confounder data
- Assess missingness patterns and any differential attrition
- Report final linked-sample counts by ethnicity, gender, and deprivation group to ensure adequate power for subgroup analyses

These checks will determine whether adjustments (e.g., combining ethnic categories, revising modelling strategies) are required to maintain analytical robustness.

¹⁹ The Wave 8 total sample is 9,735 participants. After applying exclusion criteria (residence in England and Wales, valid LSOA linkage, at least one valid outcome measure), the expected analytic sample is approximately 7,500–9,000 participants. This revised estimate will be confirmed in the interim report.

Minimum Detectable Effect Size (MDES) and statistical power

The study is powered primarily to detect effects of adolescent stop and search exposure on (RQ1.a) mental health and (RQ1.b) offending outcomes in late adolescence and early adulthood.

Based on expected final Millennium Cohort Study analytic sample sizes of approximately 10,000–12,000 participants, we conducted MDES calculations using conventional assumptions for longitudinal cohort designs. Calculations were conducted in Stata 18 using the *power* and *clustersampsi* routines.

We assume:

- Two-sided $\alpha = 0.05$
- Power = 0.80
- Exposure prevalence of 20–30% (conservative range based on prior MCS and police contact distributions)
- Intraclass correlation (ICC) for neighbourhood clustering of 0.01–0.02
- Pre-post correlation of outcomes = 0.40–0.60 (typical for adolescent mental health and behavioural outcomes in MCS)

Under these assumptions:

Primary RQ	Outcome type	MDES (SD units)	Interpretation
RQ1.a	Mental health	0.08 – 0.12 SD	Detects small but policy-relevant changes in psychological distress and wellbeing
RQ1.b	Offending	0.10 – 0.15 SD	Detects small changes in offending indices consistent with prior policing and life-course studies

These MDES values fall within the range of effect sizes reported in previous longitudinal studies of policing exposure, adolescent stress, and behavioural outcomes, indicating that the proposed sample size is sufficient to detect substantively meaningful impacts.

At the interim stage, once Wave 8 data has been incorporated and final linkage completeness are confirmed, we will update MDES calculations using observed exposure prevalence, ICCs,

outcome variances, and subgroup sizes, and revise analytic plans (e.g., collapsing categories or restricting subgroup analyses) where necessary to maintain adequate power.

3.5. Research methods and analysis

(1) Quantitative Analysis

The project will link data from the MCS with geocoded S&S records to examine how exposure to police stops during adolescence—both through personal experiences of being stopped and through the level of stop-and-search activity in one’s neighbourhood—shapes young people’s mental health and involvement in crime as they move into adulthood. Two dimensions of exposure will be assessed: individual exposure, referring to whether an adolescent reports being personally stopped by the police, and neighbourhood exposure, capturing how prevalent stop and search activity is within the area where they live. The analysis will investigate how these experiences are associated with key outcomes such as anxiety, self-esteem, externalising behaviour, overall well-being and offending behaviour, while taking into account important social, demographic, psychological and neighbourhood confounders, and using modern methods that model cumulative effects of time-varying exposures while appropriately controlling for time-varying confounders. To achieve this, the research will comprise three interlinked studies, each addressing distinct but complementary aspects of the overarching research questions.

Treatment of Ethnicity in Quantitative Analysis

Ethnicity within the Millennium Cohort Study presents known analytical challenges, including broad aggregation categories, and small cell sizes for some groups. To minimise misrepresentation, ethnicity will be treated as a socially constructed and relational category shaped by structural context, not as a fixed biological or cultural attribute. Where sample sizes permit, disaggregated categories will be retained to avoid flattening meaningful group differences. Where aggregation is statistically necessary, this will be transparently justified, and sensitivity analyses will be conducted to assess whether findings are driven by the category structure (data permitting). We will avoid interpreting ethnic differences as inherent or behavioural and will instead situate them within structural exposures, including neighbourhood context, policing density, and socioeconomic inequality. Interaction items (e.g. ethnicity and deprivation, ethnicity and gender) will be explored where appropriate to assess moderating effects. Limitations relating to ethnicity categorisation will be clearly acknowledged in interpretation to mitigate risks of over-generalisation. Where analyses yield null findings for ethnic subgroups, we will consider whether this reflects genuine absence of effect or limitations in statistical power, measurement, or category construction.

Descriptive and Preliminary Analyses

Initial analyses will summarise distributions of exposure, outcome, and covariate variables. To investigate the possibility of attrition bias, we will explore factors associated with the probability of dropping out; if missingness is not occurring at random, we will compute attrition weights accordingly. Exploratory spatial analysis will map stop and search intensity and overlay youth mental health and crime indicators. In addition, we will estimate predictive models of stop and search at both the individual level (i.e. what individual and neighbourhood characteristics predict whether a young person reports being personally stopped in the MCS) and at the LSOA level (i.e. what area characteristics predict higher rates of recorded stop and search activity). These descriptive models will provide an empirical characterisation of the exposure variable and its correlates, which is essential context for interpreting subsequent causal analyses and for assessing the plausibility of the selection-on-observables assumption.

The analysis plans for the three studies outlined below assume that the Sweep 8 (age 23) data will become available for researchers during the course of the project.

Study 1 – Youth Exposure to Policing and Criminal Offending (RQ1, H1)

Objective: This study aims to identify whether cumulative exposure to policing during adolescence has short- and long-term effects on youth offending. It will test how different dimensions of exposure (personal vs. area-level) interact, and whether these effects vary by ethnicity.

Methodology:

Using marginal structural models with weights calculated using residual balancing (Zhou & Wodtke, 2020), we will estimate short- and long-term effects of both neighbourhood and personal exposure to stop and search on self-reported offending.

This study has two primary explanatory variables of interest:

- **Cumulative neighbourhood exposure to stop and search among adolescents:** We define D_{ijt} where $T \in \{1, 2, 3, 4\}$ as the number of stop-and-search incidents in neighbourhood j where respondent i was residing during period t . Periods here refer to years 2014 ($t = 1$) through 2017 ($t = 4$), when respondents were, on average, 14 through 17. We then define cumulative neighbourhood exposure to stop and search as $cum(D_i) = \sum_1^4 d_{ijt}$, i.e., the sum of all stop-and-search records per individual across this four-year period. To account for non-linear relationships between cumulative exposures (presumably, a highly skewed distribution) and various outcomes, we use the natural logarithm of the sum, $\log(cum(d_i))$.
- **Personal experiences with police stops during adolescence:** In Sweep 6, when respondents were 14, they were asked whether they had ever been stopped and

questioned by the police. In Sweep 7, when respondents were 17, they were again asked whether they had *ever* been stopped and questioned by the police. Combining those two questions, we create a four-group categorical variable with the following categories:

- *No police stops before age 17*: respondents who answered “no” in both sweeps.
- *First police stop between ages 14 and 17*: respondents who answered “no” in Sweep 6 and “yes” in Sweep 7.
- *First police stop before age 14*: respondents who answered “yes” in both sweeps.
- *Measurement error / No police stops between ages 14 and 17*: respondents who answered “yes” in Sweep 6 and “no” in Sweep 7. This category could indicate measurement error, given the logical discrepancy, or that respondents had no police stops between ages 14 and 17. However, while the yes-then-no response pattern may reflect measurement error, these respondents are nonetheless a valid group whose inclusion should not bias estimates and may increase precision. In the revised analysis, we will include this group as a fourth category in the categorical personal exposure variable and report results both with and without their inclusion as a robustness check. We will also explore whether this group differs systematically from others on key covariates.

We model categorical variable as three dummy variables, one of which—no police stops before age 17—is taken as the reference group. We refer to respondents whose first police stop experience took place before age 14 by a_{14i} , and to respondents whose first police stop experience took place between ages 14 and 17 as a_{17i} .

In addition, this study has two primary outcome variables of interest:

- **Propensity to criminally offend among adolescents²⁰** (age 17). In Sweep 7, when respondents were 17, they were asked whether, in the previous year, they had

²⁰ The MCS online questionnaire includes additional items in the 'contact with the police' module beyond the stop question. At the interim stage, we will conduct a full review of all available police contact items across sweeps 6 and 7 to assess whether any provide more direct or better-validated measures of the experiences of interest. Items that capture the nature, context, or perceived fairness of police encounters may be particularly valuable as supplementary exposure or mechanism measures. However, we also note that prior exploratory analyses identified very small counts for some related criminal justice system items (e.g., arrest), which may limit their analytical utility and informs our cautious approach to variable selection. We will report the outcome of this review and revise the measurement approach accordingly.

engaged in the following activities: pushing or hitting someone (“Pushed or shoved / hit / slapped / punched someone?”), using a weapon (“Hit someone with or used a weapon?”), theft (“Stolen something from someone (e.g. a mobile phone, money etc.)?”), knife carrying (“...have you carried a knife or other weapon? For your own protection, because someone else asked you to or in case you get into a fight.”), gang involvement (“Are you a member of a street gang? (By a street gang, we mean groups of young people who hang around together and: have a specific area or territory; have a name, a colour or something else to identify the group; possibly have rules or a leader; who may commit crimes together.”) Details of our measurement strategy can be found below.

- **P propensity to criminally offend among young adults** (age 23). In Sweep 8, when respondents were 23, they were asked whether, in the previous year, they had carried a knife or other weapon. Aside from knife carrying, Sweep 8 also asks respondents about their arrest history, including whether they appeared in court and were found guilty for a crime. Unfortunately, these are the only self-reported offending behaviours asked in Sweep 8.

We want to estimate the effects of both exposure variables (cumulative neighbourhood exposure, $\log(\text{cum}(d_i))$, and personal experiences, a_{14i} and a_{17i} , on both outcomes of interest—propensity to criminally offend during adolescence (measured at age 17) and among young adults (measured at age 23). This analysis faces two key methodological challenges: (i) addressing time-varying confounders; and (ii) modelling self-reported offending behaviour.

Because both exposures and confounders are time-varying, some modelling precautions to appropriately control for time-varying confounders are necessary (Petersen et al., 2007; Imai & Kim, 2019). Failing to adjust for a time-varying confounder risks confounding bias, since the estimated exposure effect may instead capture the influence of a shared confounder linking exposure and outcome (Wodtke et al., 2011). Yet naïvely adjusting for such confounders can create overcontrol bias, as the confounder at time t may lie on the causal pathway from the exposure at time $t - 1$ to the outcome. This is particularly relevant here, as neighbourhood policing and neighbourhood violence are likely to be dynamically interrelated. For instance, cumulative exposure to neighbourhood violence between 2014 and 2017 may act both as a confounder and as a mediator in the relationship between cumulative exposure to stop and search and later offending (measured in 2017 or 2023).

To address this, we will use marginal structural models with residual balancing (Zhou & Wodtke, 2020), an approach specifically designed for dynamic settings, with time-varying exposures and confounders. While the inclusion of time-varying control variables in regular panel regression models introduces over-control bias, given that time-varying confounders are also mediators over time, marginal structural models permit that time-varying

confounders are appropriately controlled for without introducing over-control bias. In our case, that means that standard panel regression models cannot disentangle the cumulative effects of neighbourhood exposure to stop and search during adolescence from the effects of dynamic neighbourhood exposure to violent crime—failing to control for exposure to violent crime leads to confounding bias, whereas naively controlling for exposure to violent crime leads to over-control bias. In a nutshell, marginal structural models rely on the construction of weights that create a pseudo-population in which a given confounder at t does not affect exposure at $t+1$ —e.g., a pseudo-population in which neighbourhood exposure to violent crime does not lead to more exposure to stop and search in the following year. By producing weighted analyses (with weights created using residual balancing, which are estimated using the *rbw* package in R), we can estimate cumulative effects of neighbourhood exposure to stop and search during adolescence while effectively controlling for neighbourhood exposure to violent crime and without introducing over-control bias (see, e.g., Legewie & Cricco, 2022; Oliveira et al., 2025). Our identification strategy is still based on a (strong) selection-on-observables approach; but unlike standard analytical strategies based on a selection-on-observables assumption, including longitudinal models, our analytical strategy appropriately removes confounding bias from time-varying confounders.

The second challenge concerns the measurement and modelling of self-reported offending. With six survey items indicating different offensive behaviours at age 17, we will draw on Raudenbush et al.'s (2003) multivariate, multilevel Rasch model specifically developed to model a self-reported offending behaviour. This approach estimates the probability that a respondent, residing in a given neighbourhood, will commit a specific offence, while taking into account that some offenses are rarer than others. This method has been extended to longitudinal data (Sampson et al., 2005) and to a hybrid specification (Oliveira & Jackson, 2025).

In order to handle both time-varying confounders (e.g., using a marginal structural model with residual balancing to construct weights as developed by Zhou and Wodtke, 2020) and appropriately model propensity to criminally offend (e.g., using the IRT approach as suggested by Raudenbush et al., 2003), we fit a multilevel, multivariate Rasch marginal structural model including weights computed using residual balancing, as developed by Oliveira et al. (2025). We acknowledge that this combined model is complex, and that sparse data in some strata (particularly for rare offending outcomes or small ethnic groups) may create convergence challenges. Our contingency plan is as follows: if the full multilevel multivariate Rasch MSM does not converge, we will (i) first attempt simplification by fixing rather than estimating item discrimination parameters; (ii) if necessary, fall back to simpler outcome specifications (additive variety score or binary indicator) with the MSM weights applied; and (iii) report any convergence issues and the specification used transparently. We will also conduct preliminary power calculations and data checks at the interim stage to anticipate these issues before running the main models.

We will present results in two stages: first, a main effects model examining cumulative neighbourhood exposure and personal stop experience separately (without interaction; as specified above); second, a model adding the interaction term between neighbourhood and personal exposure (as specified below). This staged presentation aids interpretability and allows the main effects to be assessed independently of the more complex interaction specification.

Crucially, we also include interaction terms between (logged) cumulative neighbourhood exposure to stop and search, $\log(\text{cum}(d_i))$, and personal experiences with police stops, α_{14_i} and α_{17_i} . Specifically, to test whether the consequences of personal experiences with police stops depend on the wider policing context, we include an interaction between cumulative neighbourhood stop and search exposure and personal stop experiences. The rationale is that neighbourhood stop and search captures an ambient policing “climate” (visibility, likelihood of having neighbours, relatives, and friends with direct experiences of police stops, and overall a neighbourhood culture associated with police presence), while personal stop experiences capture salient, potentially stressful or stigmatizing direct encounters. We hypothesise effect modification in two plausible directions. First, personal stop experiences may be most predictive of subsequent offending in low-stop-and-search neighbourhoods, where such encounters are less normative and may be experienced as more unexpected, unfair, or stigmatizing, potentially increasing mistrust and defiance. Second, in high-stop-and-search neighbourhoods, the marginal impact of an additional personal stop may be attenuated because exposure is more routine or amplified if repeated encounters accumulate. However, in over-policed neighbourhoods, the effects of personal experiences may also be stronger, as the ambient policing context could act as a catalyst that enhances personal encounters. We therefore treat this interaction as an exploratory question.

We will present the interaction as marginal effects of personal stop experiences across the observed distribution of neighbourhood stop and search exposure (and vice versa) to aid interpretation.

Formally, let l denote the survey item of interest ($L \in \{0, 1, 2, \dots, 5\}$, with one item representing the reference group), let i denote the survey respondent ($I \in \{1, 2, \dots, N\}$), and let j denote the neighbourhood of residence ($J \in \{1, 2, \dots, J\}$). $Y_{ijl} = 1$ therefore indicates that respondent i , residing at neighborhood j self-reported committing offense l , whereas $Y_{ijl} = 0$ indicates otherwise. The multilevel, multivariate Rasch approach to this marginal structural model is then just a multilevel logistic model defined by

$$\begin{aligned} \text{logit}(Y_{ijl}) = & \delta \cdot \log\left(\sum_{t=1}^4 d_{ijt}\right) + \gamma_1 \cdot a_{14i} + \gamma_2 \cdot a_{17i} + \rho_1 \cdot \log\left(\sum_{t=1}^4 d_{ijt}\right) \cdot a_{14i} + \rho_2 \\ & \cdot \log\left(\sum_{t=1}^4 d_{ijt}\right) \cdot a_{17i} + \beta_1 \cdot X_{ij} + \beta_2 \cdot Z_j + \mu_j + \alpha_l + \epsilon_{ijl}, \end{aligned}$$

where $\log(\sum_{t=1}^4 d_{ijt})$ is the natural logarithm of cumulative exposure to stop and search between 2014 and 2017, a_{14i} is a dummy variable indicating whether respondent i had their first police stop experience before age 14, a_{17i} is a dummy variable indicating whether respondent i had their first police stop experience before age 17, X_{ij} is a row vector of individual-level control variables, Z_j is a row vector of neighborhood-level control variables, μ_j is a neighborhood-specific random intercept, α_l is a fixed effect for each survey item l (e.g., equivalent to discrimination parameters), and ϵ_{ijl} is a disturbance term. δ is the main term of an interaction and reflects the association between cumulative exposure to stop and search and the (log of the) odds of criminally offending among adolescents with no personal experience with police stops. γ_1 and γ_2 are main terms of an interaction and reflect the association of personal experiences with police stops by age 14 and 17, respectively, and the (log of the) odds of criminally offending among adolescents residing in neighbourhoods with zero stop-and-search incidents recorded between 2014 and 2017. ρ_1 and ρ_2 are interaction terms reflecting the degree to which neighbourhood exposure to stop and search moderate the effects of personal experiences with police stops on the (log of the) odds of criminally offending.

By nesting item responses within respondents (and neighbourhoods), this item response theory (IRT) approach estimates the statistical effects of all independent variables on a latent continuous variable capturing individuals' underlying propensity to offend, based on the six self-reported survey items. The latent variable is identified through the relative difficulty and discrimination parameters of each item, thereby explicitly accounting for the fact that some offences are rarer and more severe than others (Raudenbush et al., 2003). Parameters of this model are estimated using maximum likelihood and survey weights (calculated using residual balancing) using R's package *survey*. We will report item parameter estimates (difficulty and discrimination) to allow readers to assess what the latent construct is capturing and how each item contributes to it.

The practical advantage of this approach, relative to simple additive or binary indices, is that it reduces measurement error, avoids treating all offences as equally informative, and yields a more sensitive continuous outcome that improves statistical power. In other words, it does not treat willingness to commit all offences as the same (as would be assumed by a binary indicator of any offending) and properly accounts for different levels of rarity of different offending behaviours (whereas a variety score or a binary indicator would assume identical

difficulty and discrimination parameters). As robustness checks, we will replicate key analyses using (i) a simple additive offending variety score and (ii) a binary indicator of any offending, to demonstrate that substantive conclusions are not driven by the latent-variable specification.

We will estimate one marginal structural model combined with an IRT approach to estimate the effects on self-reported offending behaviour at age 17. We will then estimate two restricted versions of the marginal structural model outlined in Equation (1) to estimate effects on criminal offending at age 23: one considering recent, self-reported knife-carrying, and another considering respondents' arrest history. The two models for offending at age 23 do not draw on Raudenbush et al.'s approach, as their outcomes consist of single indicators; therefore, they model $\text{logit}(Y_{ij})$ only and remove α_i from the equation. We will also estimate additional models including interaction terms between neighbourhood exposure and personal experiences with police stops and ethnicity.

Study 2 – The Impact of Stop and Search on Youth Mental Health and Crime Involvement (RQ1, H2; RQ2, H3)

Objective: This study aims to identify whether cumulative exposure to policing during adolescence has short- and long-term effects on youth mental health. By doing so, it will clarify the mechanisms through which policing exposure may shape life-course trajectories. Specifically, it will assess whether mental health deterioration following repeated police contact contributes to later offending.

Methodology: At a first stage, this study will repeat the methodological procedures implemented in Study 1, but considering outcomes related to mental health measured at ages 17 and 23. In Sweep 7, respondents were asked whether they had been clinically diagnosed with depression or anxiety. Sweep 7 also measures respondents' psychological distress (using the Young Person Kessler 6 questionnaire), mental wellbeing (using the Young Person Warwick-Edinburgh Mental Wellbeing Scale), internalising behaviour (measured using the emotional symptoms and peer problems subscales of the Strengths and Difficulties Questionnaire), externalising behaviour (measured using the conduct problems and hyperactivity/inattention subscales of the Strengths and Difficulties Questionnaire), and self-esteem (Young Person Shortened Rosenberg Self-Esteem Scale).

In Sweep 8, respondents were asked about their current mental health and wellbeing, including whether they had ever been diagnosed with depression or anxiety, their recent psychological distress (measured using the Kessler 6 scale), and their mental wellbeing (assessed using the Short Warwick-Edinburgh Mental Wellbeing Scale). However, measures included in Sweep 7 on internalising and externalising behaviours (from the Strengths and

Difficulties Questionnaire) and self-esteem (from the Short Rosenberg Self-Esteem Scale) were not retained.

For each mental health indicator—depression or anxiety, psychological distress, mental wellbeing, internalising behaviour, externalising behaviour, and self-esteem—we will estimate marginal structural models (with weights calculated using residual balancing) assessing the association between neighbourhood exposure to stop and search and personal experiences with police stops in adolescence—as well as their interaction—and mental health measured at age 17 and at age 23. This series of marginal structural models will allow us to assess the degree to which exposures to policing during adolescence can lead to mental health problems in late adolescence and early adulthood.

Second, we will draw on state-of-the-art longitudinal mediation models with time-varying exposures and mediators (VanderWeele et al., 2017) to investigate whether the development of mental health problems mediates the effects of neighbourhood exposure to stop and search and personal experiences with police stops in adolescence on criminal offending in adolescence and early adulthood. Specifically, we will use the mediation framework developed by VanderWeele and Tchetgen Tchetgen (2017) for settings with time-varying exposures and mediators. This approach decomposes the total effect of policing exposure on offending into (a) a natural direct effect - the effect of exposure on offending that does not operate through mental health - and (b) a natural indirect effect - the effect that is transmitted via mental health deterioration. Identification relies on sequential ignorability assumptions: no unmeasured confounding of the exposure-outcome, exposure-mediator, or mediator-outcome relationships. We will assess the plausibility of these assumptions using sensitivity analyses. Using the causal mediation analysis framework (Imai et al., 2023), this will allow us to estimate indirect effects and the proportion of total effects of policing exposure on criminal offending that are mediated through mental health problems.

Study 3 – Generational Trends in the Effects of Police Contact

Although earlier cohort studies cannot be linked with area-level policing data—given that stop-and-search records from previous decades are not available—they allow us to explore generational and socio-political shifts in the associations between youth contact with police and mental health and offending. This will provide indicative evidence on whether the psychological consequences of stop and search have changed over time, while acknowledging that major differences in how stop and search operated across eras, and in how surveys capture mental health and offending, will limit the comparability of findings.

Objective: Assess how associations between adolescent police contact and mental health in early adulthood have evolved across generations in England and Wales.

Methodology:

For this analysis, we will draw on longitudinal data from two cohort studies: the 1970 British Cohort Study, which follows the lives of children born in 1970, and the Millennium Cohort Study, which follows the lives of children born in 2000. Both studies contain several measures of youth police contact and mental health as well as offending indicators across the life course.²¹

First, we will partially replicate Niel et al.'s (2021) analysis from the United States and understand cohort differences in group-based arrest trajectories over several decades. Using data from both the BCS and the MCS, we will look at respondents' arrest histories²² and fit group-based trajectory models (Nagin, 2009) to find sub-groups of arrest trajectories across different cohorts. For example, while most respondents will likely fall into a "no-offense" category, some may be consistently offending across their life courses, others may have had one-off experiences of arrests during adolescence but not in adulthood, whereas others may have had their first arrest later in the life course. When assessing those groups of trajectories, we will examine the degree to which personal experiences with police stops during adolescence contributes to group membership.²³

Second, we will conduct a series of bivariate latent growth curve models (Bollen & Curran, 2006) simultaneously assessing developmental trajectories of mental health symptoms and arrest history in the life course. Bivariate latent growth curve models allow for two developmental trajectories to be estimated while influencing each other over time. That way, we can examine the extent to which developmental trajectories of mental health and arrest are related to each other. In addition, we will examine the degree to which personal experiences with police stops during adolescence contributes to the initial state and the shape of such trajectories. We will fit different models using BCS and MCS data, although results will be directly compared.

²¹ The other two longitudinal cohort studies housed by the UCL Centre for Longitudinal Studies—the 1958 National Child Development Study and the 1990 Next Steps—unfortunately do not have measures of direct police contact during adolescence.

²² We will use arrest history rather than self-reported offending because of data availability, since the BCS only contains a set of questions measuring self-reported offending during adolescence.

²³ It may also be possible to include data from the 1990 Next Steps cohort for this descriptive component of the analysis, although those data cannot be used to examine the effects of youth police contact on trajectory membership. Including Next Steps could enhance the comparative aspect across cohorts, but using different datasets for separate components of the analysis may introduce additional complexity.

This analysis will allow us to find generational differences in the associations between youth police contact and the development of mental health problems and crime involvement across the life course, as well as—using BCS data—explore some potential longer-term, life-course consequences of being stopped by the police during adolescence.

(2) Qualitative analysis

To complement the quantitative analysis (i.e. contextualise and deepen understanding of the quantitative findings and explore potential mechanisms not captured in the survey data), we will conduct a small qualitative study exploring young people’s lived experiences of stop and search during adolescence. Specifically, we will conduct 15–20 semi-structured interviews (estimated duration: 45-60minutes) with young people aged 18–24 who experienced stop and search between ages 10–17²⁴. Participants will be recruited through partner organisations such as youth charities, mental health organisations, and community groups, leveraging networks through the College of Policing.

The interviews will examine the emotional, psychological, and behavioural effects of these encounters, perceptions of fairness and legitimacy, and views on how police practice could be improved to reduce harm and build trust²⁵:

Component #	Section Title	Focus / Key Questions
1	Introduction & Rapport Building	Welcome, consent, purpose of research, setting expectations.
2	Background & Context	Participant’s background, community, neighbourhood, police visibility.
3	Experiences of Stop and Search	First stop event, number of stops, context, reasons, reactions.
4	Emotional & Psychological Impact	Feelings during and after stops, effects on trust, confidence, mental health.

²⁴ See Appendix 2 for a draft version of the interview schedule.

²⁵ See Appendix 2 for a copy of the interview schedule.

Component #	Section Title	Focus / Key Questions
5	Perceptions of Fairness & Legitimacy	Attitudes towards police, fairness of S&S, definitions of “fair treatment”.
6	Behavioural & Social Responses	Changes in behaviour, day-to-day routines, peer/family relationships, offending/avoidance.
7	Coping Mechanisms & Support Systems	Who they turned to, types of support, what young people need post-encounter.
8	Reflections & Recommendations	What they wish police had done differently, advice for officers, changes to build trust.
9	Closing & Debrief	Final reflections, additional points, participant rights, support recap, thanks.

Interviews will be conducted wither in-person or secure video call (depending on participant preference and safeguarding guidance). Interviews will then be transcribed verbatim and analysed using thematic analysis (Braun & Clarke, 2006). Initial codes will be mapped onto four overarching themes explicitly aligned with the quantitative theoretical framework and the mechanisms specified in Hypothesis 1. Specifically, the themes capture processes central to procedural justice (perceptions of fairness, legitimacy and trust), legal cynicism (meanings attached to police contact and perceived fairness), labelling (experiences of stigma, identity, and behavioural responses following police contact), and general strain (emotional and psychological consequences and coping responses). The four overarching themes are:

- Experiences and meanings of stop and search (legal cynicism, labelling)
- Emotional and psychological consequences (general strain)
- Perceptions of fairness, legitimacy and trust (procedural justice)
- Coping, resilience, and recommendations for change (buffering and adaptive responses)

Findings will be integrated with quantitative analyses to illuminate mechanisms linking policing exposure, mental health, and offending outcomes. Qualitative findings will be integrated with quantitative results regardless of the direction or significance of the latter. If quantitative analyses yield null or even positive average effects, qualitative findings will be used to explore potential explanations - for example, whether participants describe coping mechanisms that may buffer harms at the individual level, or whether positive effects (e.g.

perceived community safety) emerge alongside negative ones. The integration approach will follow a convergent mixed-methods design, in which qualitative themes are used to contextualise, interpret, and elaborate quantitative findings, including areas of convergence, divergence, and complexity across data sources.

3.6. Missing data

Because this project relies primarily on secondary longitudinal data, we anticipate several forms of missingness that may affect both exposures and outcomes. Below, we describe our current expectations, how missing data may influence the analysis, and the strategies we will use to address it. Final decisions regarding the missing-data approach will be made at the interim stage, once data completeness can be directly assessed.

1. Expected sources of missing data

a. Missing or incomplete variables relevant to the research questions

Although the MCS contains rich measures on policing experiences, mental health, and offending, several limitations remain:

- Stop and search detail: MCS measures include whether an S&S occurred but do not capture all contextual information (e.g., officer behaviour, perceived fairness).
- Offending measures: Self-reports may be incomplete due to item non-response or reluctance to disclose sensitive behaviours.
- Wave 8 (age 23): Full availability of mental health and offending measures is not yet confirmed (Wave 8 data was recently released) and will be explored during the interim phase.
- A related and important concern is that individuals most likely to have been involved in offending may be systematically less likely to participate in Wave 8 - particularly if they are incarcerated at time of data collection. This would introduce bias that is directly correlated with the outcome of interest, and standard multiple imputation methods may not fully address it. We will assess the extent of this problem by comparing Wave 7 characteristics of those who do and do not participate in Wave 8, with particular attention to prior offending indicators. Results from offending outcome analyses will be interpreted with explicit acknowledgement of this limitation.

These limitations do not prevent analysis but may influence precision and model specification.

b. Missing observation-level data

We expect several forms of missingness at the participant level:

- Longitudinal attrition between ages 11, 14, 17, and 23 (a well-documented feature of MCS).
- Item non-response, particularly for sensitive questions on offending, mental health, income, and police contact.
- Missing residential LSOA identifiers, which would prevent neighbourhood-level linkage.
- Inexact linkage with stop and search data due to occasional suppression or rounding of geocodes on police.uk.

Based on prior MCS research, attrition may reduce the sample by 20–30% by late adolescence, though linkage quality to LSOA is typically high.

2. Plans to assess missingness during the interim stage

During the interim report period, we will conduct a systematic missing-data assessment, including:

- Descriptive missingness tables for each exposure, outcome, and confounder.
- Cross-tabulations to check whether missingness is patterned by ethnicity, gender, deprivation, or baseline characteristics.
- Longitudinal drop-out models to test predictors of attrition between sweeps.
- Linkage completeness checks for all neighbourhood datasets (stop and search, crime, IMD, Census, SAMHI).
- Assessment of item availability and scale reliability for Wave 8 (age 23) mental health and offending measures.

These analyses will help identify whether data are likely to be Missing Completely at Random (MCAR), Missing at Random (MAR), or Missing Not at Random (MNAR).

3. Potential impact of missing data

Missing data may affect the project in several ways:

- Reduced sample size, particularly for mediation and generational analyses requiring multiple waves.
- Biased estimates, if missingness is correlated with policing exposure or outcomes (e.g., higher attrition among marginalised groups).
- Limited disaggregation, especially for moderation by ethnicity if missingness is uneven across groups.
- Reduced measurement precision, particularly for self-reported offending.

However, the MCS dataset is designed for robust longitudinal analysis, and prior research suggests that biases can be mitigated effectively through appropriate methods.

4. Strategies to handle missing data

We will implement a range of approaches depending on the pattern and scale of missingness identified at the interim stage:

a. Multiple imputation

If data appear to be Missing at Random (MAR):

- We will use multiple imputation by chained equations (MICE).
- Imputation models will include:
 - all exposures, outcomes, mediators, and confounders,
 - demographic variables (gender, ethnicity, SES),
 - prior wave outcomes to support MAR assumptions,
 - auxiliary variables predictive of missingness (e.g., survey paradata).
- We anticipate using 20–40 imputations, depending on the proportion of missingness.

Sensitivity analyses will compare imputed versus complete-case models.

b. Full-information maximum likelihood (FIML)

For mediation or structural models, FIML may be used to efficiently incorporate partially observed data without imputation.

c. Robustness and sensitivity analyses

We will conduct:

- Attrition-weighted models using inverse probability of attrition weights.
- Comparison of early- vs late-responders, where helpful.
- Sensitivity to missing neighbourhood indicators (e.g., SAMHI gaps).

Attrition bias by ethnicity will be explicitly assessed. Longitudinal drop-out analyses will include ethnicity as a key predictor of attrition between sweeps, alongside gender, deprivation, and other baseline characteristics. If attrition is found to be systematically higher among marginalised ethnic groups - as is common in longitudinal studies - we will implement ethnicity-stratified attrition weights and assess the sensitivity of main findings to these weights. Any residual concerns about differential attrition by ethnicity will be reported transparently as a limitation.

d. Linkage failure strategies

For stop and search linkage:

- Records with ambiguous geocodes will be assessed and included only if assignable to a unique LSOA.

- We will test the impact of excluding uncertain geocodes on area-level exposure distributions.

5. Decision rules for final approach

At the interim stage, we will adopt the following decision rules:

- If missingness <10% for a variable: complete-case analysis may be acceptable, supplemented by sensitivity checks.
- If missingness 10–30%: multiple imputation or FIML will be used.
- If missingness >30% or systematically patterned: variable redesign (e.g., combining categories, using coarser harmonised measures) will be considered, and limitations will be clearly reported.

3.7. Other potential limitations or sources of bias

Several additional limitations may affect the analysis. Self-reported measures of police contact, mental health, and offending may be subject to recall bias or social desirability bias, potentially leading to underreporting of sensitive behaviours. Moreover, the phrasing of the self-reported measures means that questions such as “have you ever been stopped by the police?” may capture a broader range of police encounters than formal stop-and-search under specific police powers. While this limits precision in measuring legally defined stop-and-search activity, it may also better capture the subjective experience of police contact that is most relevant to young people’s perceptions, mental health, and behavioural outcomes. Stop and search data obtained from police.uk may contain geocoding imprecision or suppressed locations, which could introduce measurement error in neighbourhood exposure estimates. Similarly, caution is needed when using LSOAs as the unit of spatial aggregation for neighbourhood policing exposure, as their scale may obscure highly localised and time-specific clustering of stop-and-search activity, leading to substantial variation in actual exposure among young people within the same area. As with many longitudinal studies, the MCS may exhibit differential attrition, with some marginalised groups more likely to drop out, and weighting or imputation may not fully eliminate these biases. Cross-cohort comparisons with BCS70 may also be constrained by differences in measurement instruments and changes in policing practices over time. Finally, examining multiple outcomes and modelling specifications introduces multiplicity, increasing the potential for chance findings; this will be mitigated through appropriate correction procedures and robustness checks. Below we elaborate on these.

It is also important to acknowledge that several of the limitations described in this section are not merely technical but are structurally racialised. Structural racism can shape who is recorded in administrative datasets (see, e.g., Knox et al., 2020), what gets recorded, and how

accurately - potentially biasing estimates in inequitable ways. For example: missing data may be disproportionately concentrated among marginalised ethnic groups, particularly those who are most affected by stop and search; administrative under-recording of stop and search may be higher in areas with lower race equity scrutiny (Dawson et al., 2026); self-report bias in offending measures may vary by ethnicity due to differential policing surveillance (those more heavily policed may both under-report and over-report offending for different reasons); and measurement error in the exposure variable is likely patterned by ethnicity in ways that complicate straightforward bias correction. We will address these concerns through the sensitivity analyses described above, and will be explicit about residual limitations in the interpretation of findings.

Multiplicity, correction procedures and robustness checks

Given the multiple outcomes, exposures, time points and interaction/mediation tests specified in RQ1–RQ4, we will apply pre-specified procedures to control for multiplicity and to ensure the robustness of findings.

Primary family of confirmatory tests

The confirmatory family comprises tests addressing the primary research questions:

- RQ1.a (mental health outcome)
- RQ1.b (offending outcome)
- RQ1.c (interaction between personal and neighbourhood exposure)

For this family, we will control the family-wise error rate (FWER) using the Holm–Bonferroni procedure ($\alpha = 0.05$). These adjusted p-values will be used to determine statistical significance for confirmatory inference.

Secondary and exploratory families

Mediation analyses (RQ2.a–RQ2.d) and subgroup and generational heterogeneity analyses (RQ3–RQ4) will be treated as secondary/exploratory. For these families, we will control the false discovery rate (FDR) using the Benjamini–Hochberg procedure ($q = 0.10$) and interpret results cautiously as hypothesis-generating.

All unadjusted and adjusted p-values will be reported.

Pre-specified robustness and sensitivity checks

For all primary analyses (RQ1 family), we will conduct the following robustness checks:

1. Alternative exposure operationalisations

- a. Use non-logged and categorised versions of neighbourhood stop and search exposure.
 - b. Use binary and count versions of personal stop exposure.
- 2. Alternative outcome specifications
 - a. For offending, replicate analyses using (i) the latent IRT score, (ii) a simple additive offending index (variety score), and (iii) a binary “any offending” indicator.
- 3. Missing data and attrition
 - a. Compare complete-case estimates with results from multiple imputation and inverse probability weighting.
- 4. Unobserved confounding
 - a. Conduct sensitivity/bounding analyses to assess how strong unobserved confounding would need to be to explain away estimated effects.
- 5. Placebo/falsification tests
 - a. Test exposure–outcome associations for outcomes measured prior to adolescence where available.
- 6. Residential mobility due to policing and crime
 - a. Another potential source of bias is that residential sorting may be endogenous to policing exposure. Families may move into or out of heavily policed areas in response to crime or policing, meaning that by adolescence, those most exposed to policing may be a selected group of individuals whose families were unable or unwilling to move away from high-policing areas. This could bias estimates if residential stability is correlated with outcomes. As a robustness check, we will estimate a version of the main models that assigns exposure based solely on age 14 (Wave 6) residential LSOA for all respondents, regardless of subsequent moves.

Results will be considered robust if substantive conclusions are consistent across these specifications.

Further limitations

Another limitation concerns whether LSOAs are an appropriate unit of spatial aggregation for measuring neighbourhood policing exposure. LSOAs contain on average around 1,500 residents, and stop and search events within an LSOA may be concentrated in particular streets or locations, meaning that two young people in the same LSOA could have very different actual exposure to visible policing. Additionally, stop and search activity tends to cluster around specific times and places (e.g. evening, transport hubs) rather than being evenly distributed, raising questions about whether cumulative counts per LSOA adequately capture the likely experiential exposure of a young person living there. These limitations will be acknowledged explicitly in the presentation of findings, and we will explore whether alternative spatial aggregations (e.g. ward level) or time-restricted counts (e.g. excluding

school hours) alter the pattern of results. To address concerns regarding temporal variation, we could use workplace-daytime population estimates rather than residential LSOA population counts where possible (ONS, 2023).

A further limitation concerns the binary measure of personal stop experience used in this study. Asking respondents whether they have 'ever been stopped by the police' does not capture variation in the meaning, intrusiveness, or psychological impact of those encounters. A stop may represent very different levels of threat, stigma, or trauma depending on a young person's racialised position - for example, for Black young people who experience stops as part of a broader pattern of racialised surveillance, the psychological consequences may be qualitatively different from those experienced by young people for whom a stop is an isolated and unexpected event. This means our binary exposure measure likely underestimates the true variation in experience across ethnic groups, and may contribute to underestimating effects for the most affected groups. Where data permit, sensitivity analyses will explore whether findings differ across ethnic groups in ways consistent with this limitation.

Moreover, an important caveat for policy interpretation is that the MCS survey item ("have you ever been stopped by the police?") captures a broader range of police encounters than formally recorded stop and search under statutory powers. Young people may report being "stopped" in response to encounters that did not constitute a formal stop and search (e.g. stop and account, informal questioning). When communicating findings to police forces and policing researchers, it will therefore be important to present results as reflecting the effects of police encounters more broadly - including but not limited to formal stop and search - rather than as evidence solely about the exercise of statutory stop and search powers. This distinction matters for how forces should interpret findings and which operational practices they should consider modifying in response.

Table 3.10: Threats to internal validity (not relevant for descriptive studies)

Table 3.10a - RQ1.a: Effect of stop and search exposure (14–17) on mental health in late adolescence/early adulthood

Threat	Risk level	Comments
Selection bias / attrition	Medium	Non-random attrition between sweeps may correlate with both policing exposure and mental health. Mitigated using survey weights, inverse probability

		weighting and multiple imputation; residual risk remains.
Confounding (observed)	Low	Rich pre-adolescent confounders (SDQ, family SES, neighbourhood deprivation, prior wellbeing) are available; marginal structural models adjust for time-varying confounding.
Confounding (unobserved)	Medium	Some unmeasured family and contextual factors may remain; sensitivity/bounding analyses will be conducted.
Measurement error – exposure	Medium	Administrative SS records may under-capture encounters and have geocoding imprecision; explored via alternative exposure operationalisations.
Measurement error – outcome	Low	Mental health measures in MCS are well-validated with relatively low missingness.
Temporal ordering	Low	Exposure measured 14–17 precedes outcome measurement in late adolescence/early adulthood.
Model misspecification	Medium	Addressed through alternative specifications, functional forms, and falsification tests.
Interference / spillovers	Medium	Neighbourhood policing climate may affect peers; clustering and neighbourhood random effects partially mitigate.

Table 3.10b - RQ1.b: Effect of stop and search exposure (14–17) on offending in late adolescence/early adulthood

Threat	Risk level	Comments
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Selection bias / attrition	Medium	Higher attrition among young people most affected by policing possible; mitigated via IPW and imputation.
Confounding (observed)	Low	Extensive childhood behavioural, family, and neighbourhood covariates included; MSMs address time-varying confounding.
Confounding (unobserved)	Medium	Residual unmeasured propensity to offend may remain; bounding analyses planned.
Measurement error – exposure	Medium	Possible under-recording of SS and geocoding imprecision; alternative exposure definitions tested.
Measurement error – outcome	Medium	Offending is self-reported and subject to under-reporting; mitigated using IRT latent modelling and robustness checks with simpler indices.
Temporal ordering	Low	Exposure precedes offending outcomes.
Model misspecification	Medium	Addressed through robustness checks, alternative outcome constructions, and placebo tests.
Interference / spillovers	Medium	Peer and neighbourhood spillovers possible; clustering adjustments applied.

Table 3.10c - RQ1.c: Interaction—Does neighbourhood SS modify effects of personal SS on mental health/offending?

Threat	Risk level	Comments
Selection bias / attrition	Medium	As above; subgroup patterns may amplify attrition bias; IPW and imputation used.

Confounding (observed)	Medium	Interaction estimates rely on correct specification of both main effects and modifiers; rich covariate set included.
Confounding (unobserved)	Medium–High	Effect modification more sensitive to unmeasured factors; results interpreted cautiously and treated as secondary-confirmatory.
Measurement error – exposure	Medium	Error in either exposure can bias interaction terms; alternative specifications will be tested.
Measurement error – outcome	Medium	Particularly for self-reported offending; IRT modelling and robustness checks applied.
Temporal ordering	Low	Modifier and exposure measured prior to outcomes.
Model misspecification	Medium–High	Interactions sensitive to functional form; marginal effects will be plotted and alternative forms tested.
Interference / spillovers	Medium	Neighbourhood spillovers could affect interpretation; clustering adjustments applied.

4. Project management

4.1. Risks and mitigations

Table 4.1 Risks and mitigations

Number	Risk	Likelihood (Low/Medium/ High)	Mitigation
1	Delay in obtaining Secure Access approval or Safe Researcher accreditation for all team members	Medium	One team member (Dr Kyprianides) already has full SecureLab access; others are completing accreditation. Analyses will begin using accessible components while approvals are finalised.
2	Incomplete linkage between MCS residential LSOAs and police stop and search data	Low	Conduct early linkage diagnostics; use alternative exposure operationalisations.
3	Higher-than-expected missing data or attrition in key variables (e.g., Wave 8 outcomes, offending measures)	High	Use multiple imputation and inverse probability weighting; run missingness diagnostics at interim stage; adapt model specification if required (e.g., coarser measures, reduced set of outcomes for older age group).
4	Measures differ across cohorts, limiting comparability in generational analysis	Medium	Conduct detailed harmonisation work at interim stage; test robustness using alternative harmonised specifications; be transparent about comparability constraints.
5	Challenges recruiting participants for qualitative interviews (e.g., hard-to-reach populations)	Medium	Partner with trusted youth organisations; offer flexible interview modes; adjust recruitment strategies; widen

			recruitment networks if necessary.
6	Risk that observational design cannot fully rule out unobserved confounding	High	Apply a suite of robustness and sensitivity analyses (e.g., bounding methods, alternative specifications, falsification tests); interpret findings cautiously and transparently.
7	Potential delays in integrating quantitative and qualitative strands	Low	Regular cross-team meetings; shared analytic timelines; early development of integration framework.
8	Staff turnover or reduced capacity during the project	Low	Clear documentation of workflows; shared code repositories; overlapping skills across team; ability to redistribute tasks if needed.
9	Delay or non-availability of MCS Sweep 8 (age 23) data during the project period	Medium	The analysis plans for the three studies assume that Sweep 8 (age 23) data will become available during the course of the project. If delayed, we will prioritise analyses using late-adolescence outcomes (Sweep 6/7), adjust timelines, and update interim-stage MDES and analysis plans accordingly.
10	Misinterpretation or misuse of findings on ethnic differences in public or policy debates	Medium	Findings on ethnic differences will always be contextualised within the structural and historical context of racialised policing; dissemination materials will include explicit guidance on appropriate interpretation; the research team will engage proactively with affected communities before public release of findings

			to anticipate and address potential misreadings; and publications will include clear statements about the structural, not behavioural, interpretation of any observed differences.
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4.2. Timeline

Table 4.2 Timeline

Phase	Date	Activity	Staff responsible/leading ¹	Deliverables/ outputs
Phase 1: Protocol Development and Data Access	Month 1	Develop full research protocol and study design	Dr Thiago Oliveira (TO) & Dr Arabella Kyprianides (AK)	Ethically approved and finalised research protocol
		Submit protocol for institutional ethical approval	AK	
	Months 1 - 2	Secure access to MCS secure data; download all open access datasets required for analysis (non-secure MCS, S&S and crime police data, SAMHI, IMD, Census, BCS70)	AK	Data acquisition
	Month 3	Prepare datasets for analysis	TO (lead) & PDRA	Linked master dataset
	Months 1-2	Recruitment of Postdoctoral Research Associate (PDRA)	TO	Recruitment process for PDRA initiated
	Month 3	Submit first draft analysis plan to YEF for comment/peer review: 9 Feb 2026	AK (lead) & all team members to review	First draft analysis plan
	Month 3	Submit final draft analysis plan (including responses to feedback): 13 March 2026	AK (lead) & all team members to review	Final draft analysis plan
	Months 4-6	Appoint and onboard PDRA	TO to appoint, AK to onboard	PDRA appointed and onboarded

Phase 2: Interim Analysis and Feasibility Testing	Months 4–6	Descriptive analysis: profile study population; analyse prevalence of S&S, mental health outcomes, and self-reported offending by key demographics (age, ethnicity, socioeconomic status)	PDRA (lead) & TO	
	Months 6–9	Preliminary quantitative analysis	TO (lead) & PDRA	
	Months 6–8	Qualitative interview recruitment and interviews	AK	
	Month 9	Preliminary qualitative analysis	AK	
	Months 7–9	Methodological exploration	TO (lead) & PDRA	
	Months 4–9	Interim report drafting summarising: Descriptive results; Preliminary quantitative insights; Preliminary qualitative insights; Methodological refinements.	AK (lead) & all team members to review	
	Month 9	Submit first draft interim research report submitted to YEF for comment: 8 May 2026	AK (lead) & all team members to review	First draft interim research report
	Month 9	Submit final draft interim research report (including responses to feedback): 12 June 2026	AK (lead) & all team members to review	Final draft interim research report
Phase 3: Final Analysis, Reporting, and Dissemination	Months 10–14	Conduct full quantitative analyses, including mediation, moderation, and generational comparison	TO (lead) & PDRA	Finalise Quantitative Analysis
	Months 10–14	Conduct full qualitative analysis	AK	Finalise Qualitative Analysis
	Months 15	Integrate qualitative findings with quantitative results	AK (lead) & TO & PDRA	

	Months 10–18	Draft final report for YEF	AK (lead) & all team members to review	
	Month 17	Submit first draft final research report to YEF for comment/peer review: 23 April 2027	AK (lead) & all team members to review	First draft final research report
	Month 18	Submit final draft final research report: 18 June 2027	AK (lead) & all team members to review	Final draft final research report
	Months 10–18	Dissemination activities (policy briefings, academic outputs) ²⁶	PQ (policy engagement lead), AK to lead academic outputs (academic journal articles, conference presentations), all team members to review outputs	Policy briefs for dissemination; Stakeholder and public engagement activities complete; academic papers submitted to journals

¹Notes on allocation

- TO leads all major quantitative and analytical tasks.
- PDRA supports all statistical and data-processing tasks under TO's supervision.
- AK leads project management, qualitative work, ethical approvals, and writing.
- BB contributes high-level oversight, conceptual guidance, and final report review.
- PQ leads policy translation and dissemination tasks.

²⁶ Dissemination will also extend to affected communities - including youth organisations, community groups, and organisations representing people disproportionately affected by stop and search. This supports ethical research practice, enhances real-world impact, and reflects the equity commitments of the project. Accessible summaries of findings will be produced for non-specialist audiences, and the research team will engage with community groups during the dissemination phase to discuss implications and facilitate community-led use of the evidence.

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Appendix 1: core structure of the DAG

First, Figure A1 displays a simple DAG depicting only the variables of interest: the two exposure variables (*Neighbourhood Exposure to Stop and Search* and *Personal Experiences with Police Stops*), the mediator (*Mental Health Problems*), and the outcome (*Crime Involvement*). This DAG permits the visualisation to the premised causal chain, through which both neighbourhood exposure to stop and search and personal experiences with police stops lead to mental health problems, which in turn increases the likelihood that individuals get involvement with criminal activity.

Figure A1. A simple DAG with no confounders.

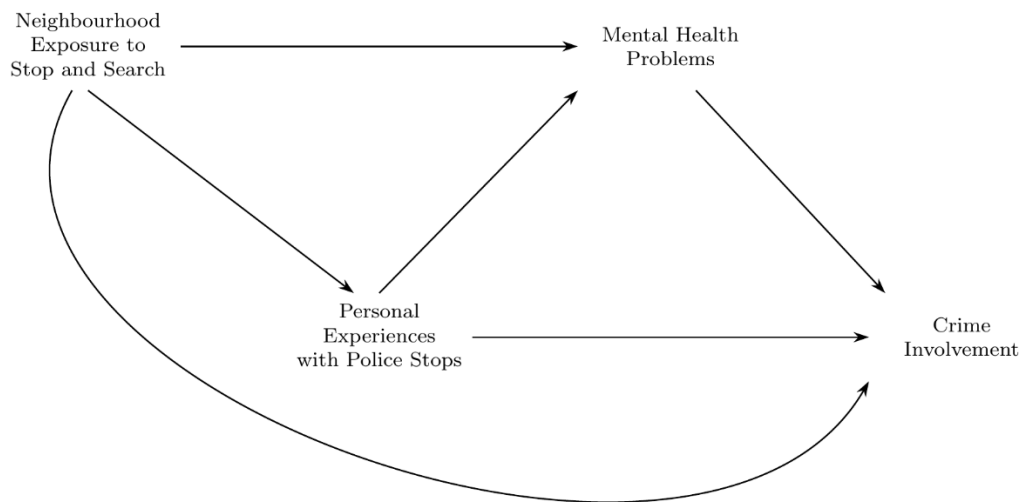
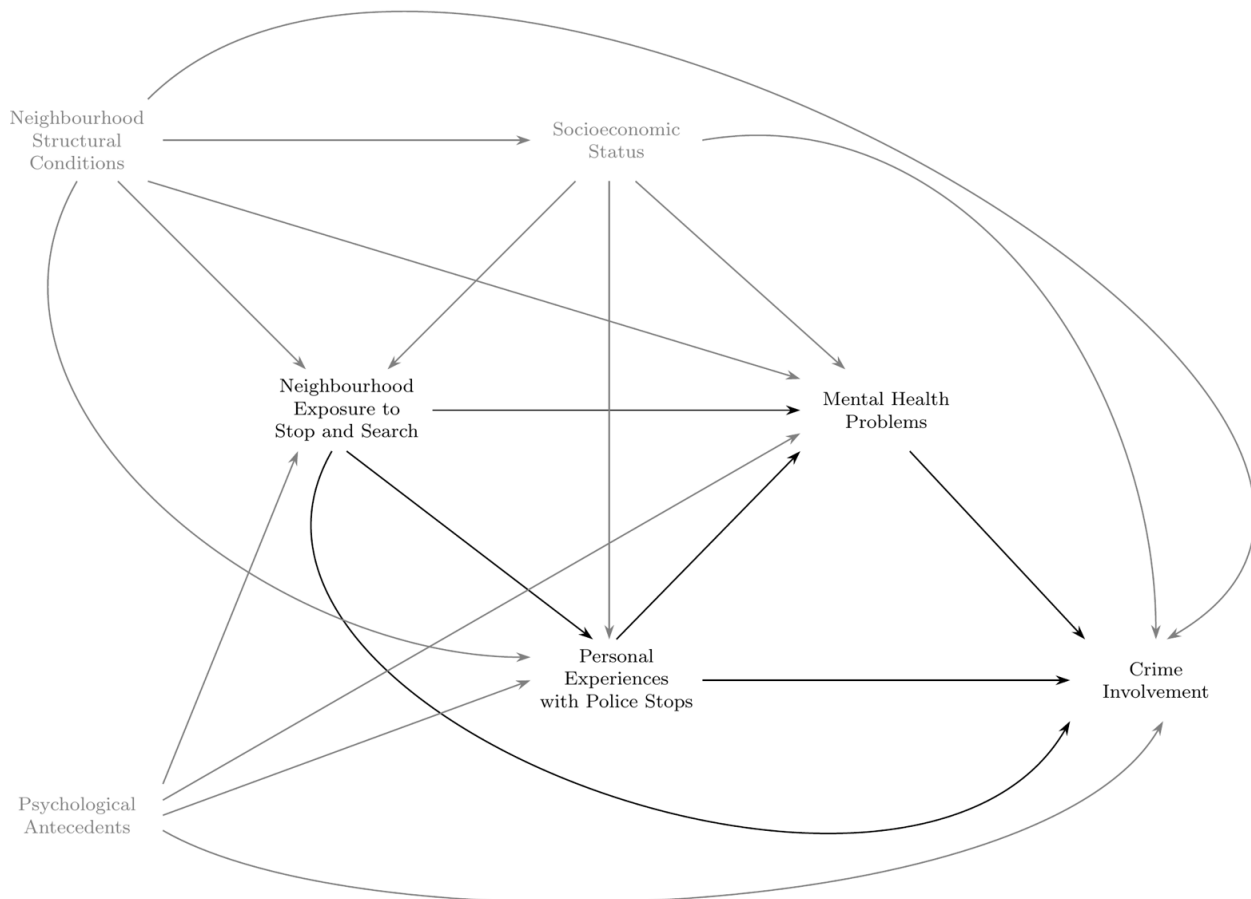


Figure A1 is, evidently, a simplification of reality as it assumes the existence of no confounders. In reality, several factors confound the relationship between youth exposure to policing, mental health, and criminal offending.

Figure A2 displays a more complex version of this DAG, including confounders. This analysis relies on a selection-on-observables assumption, although in reality it is possible that several other unobserved (and potentially unobservable) confounders also exist. Still, our design draws on rich data from the Millennium Cohort Study that includes the measurement of confounders across a wide range of dimensions. For visual ease, the DAG displayed in Figure A2 considers three groups of confounders: *neighbourhood structural conditions*, which includes the structural characteristics of neighbourhoods in which MCS respondents grew up, such as crime rates, deprivation index, concentrated disadvantage, among others; *psychological antecedents*, which includes individual traits measured during childhood that could predict crime involvement, the development of mental health problems, and greater likelihood of being stopped by the police, such as low self-control, aggressiveness, and other psycho-biological traits; and *socioeconomic status*, which includes socioeconomic conditions,

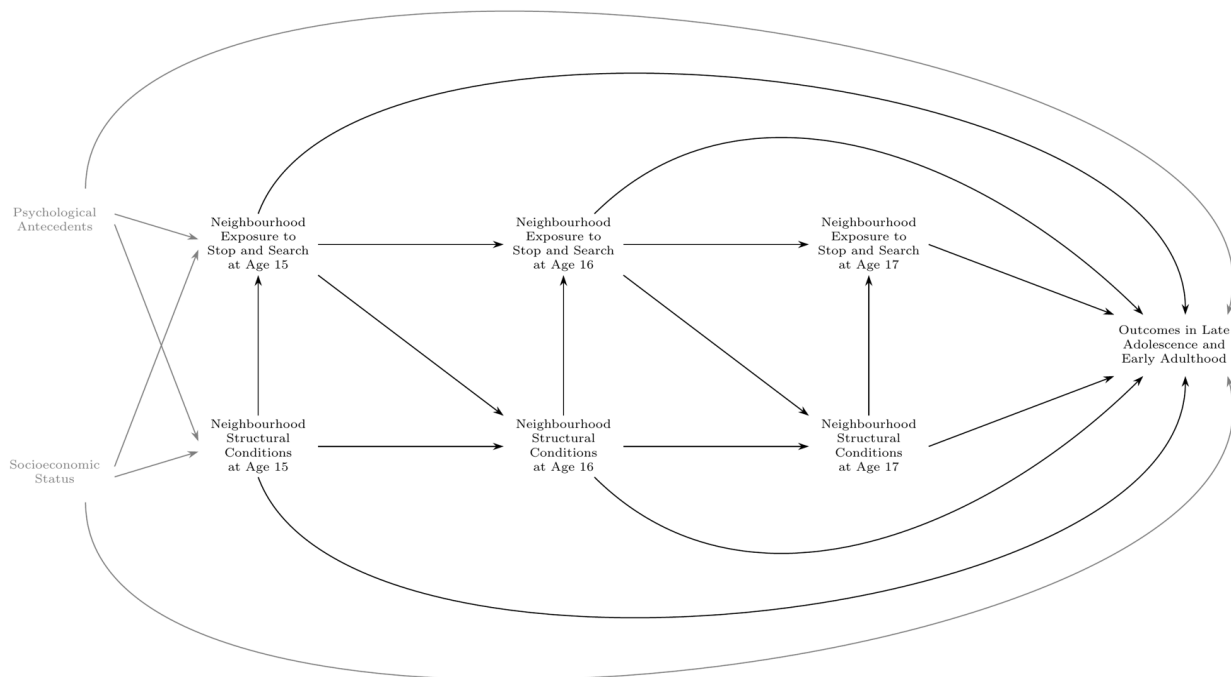
parental background, ethnicity, among others. The DAG displays how these factors confound the relationships between exposures, mediator, and outcome, and how appropriately conditioning on them is crucial to avoid bias emerging from backdoor paths.

Figure A2. A more complex DAG with confounders.



Finally, both DAGs displayed so far are simplistic in that they do not display any temporal dependencies. Instead, they provide a summary of premised relationships from a cross-sectional point of view. In reality, the relationship between exposures, confounders, mediator, and outcome is more complex because those variables are dynamic. Specifically when dealing with time-varying exposures—and time-varying confounders—the relationships become considerably more complicated. Figure A3 depicts a DAG with temporal dimensions.

Figure A3. A DAG with time-varying confounders.



Neighbourhood structural conditions—crime rates, in particular—and neighbourhood exposure to stop and search are dynamically related. Structural conditions confound the relationship policing exposure and crime involvement (and mental health problems), however, the amount of policing in the neighbourhood can also influence neighbourhood structural conditions—crime rates, in particular—at a future point in time. Looking at the DAG in Figure A3, it is clear that neighbourhood structural conditions need to be conditioned upon, as otherwise a backdoor pathway remains open; but neighbourhood structural conditions at T+1 are also a mediator of the relationship between neighbourhood exposure to stop and search and crime involvement (and mental health), and therefore conditioning on it *introduces* overcontrol bias. This DAG highlights the importance of relying on appropriate methods for time-varying exposures, such as marginal structural models with residual balancing.

Appendix 2: interview schedules

Interview Schedule: young people's experiences of police stop and search

1. Introduction and rapport building

- Welcome the participant, thank them for taking part, and remind them that participation is voluntary – they can stop or skip any question at any time without giving a reason.
- Reassure them that everything they share will be kept confidential and anonymised.
- Explain this will be a relaxed, informal conversation. Provide information about available support services.

Study explanation (read or paraphrase):

"We're speaking with young people who have experienced police stop and search, to understand how those encounters may have affected them. We recognise that stop and search does not affect all communities in the same way, and that experiences can be shaped by race, ethnicity, gender, age and where someone lives. There are no right or wrong answers — please share whatever feels true for you. We can take breaks at any time, and you don't have to answer any question you don't want to."

2. Background and context

Q1. Can you tell me a bit about yourself and what it was like growing up in your area?

Prompts if needed:

- *How would you describe the area? What were the people like? What did young people tend to do?*
- *How visible was the police presence where you grew up?*
- *Did you notice differences in how police interacted with different groups of young people?*

3. Family and early influences

Interviewer: introduce this section gently – "I'd like to ask a few questions about people around you growing up – feel free to skip anything you'd rather not answer."

Q2. Growing up, what kinds of things — if any — did people around you (like family, friends, others) say or know about the police, or about being stopped?

Prompts if needed:

- *Do you know if people around you ever had encounters with the police? Have you ever heard about someone close to you being stopped and searched?*

- Did anyone give you advice about how to behave if you were stopped by the police?
- Do you think young people from all backgrounds receive similar advice?
- Did what you heard or saw from others influence how you felt about the police?

4. Experiences of stop and search

Interviewer: “I’m now going to ask about your experiences of being stopped by the police. Please only share what you feel comfortable with.”

Q3. Can you tell me about the first time you were stopped by the police — or a time that stands out to you? Can you walk me through what happened?

Prompts if needed:

- How old were you? Where did it happen?
- Did the officers explain why they stopped you?
- How did they approach or speak to you? Was there anything that made you feel more or less comfortable?
- Roughly how many times have you been stopped in total? Were these experiences similar or different?
- Did you feel certain factors – such as age, race/ethnicity, clothing, or location – influenced whether or how you were stopped?

5. Self-perception and identity

Interviewer: “I’d like to ask whether your experiences with the police had any effect on how you saw yourself. People’s experiences vary greatly – we’re just interested in yours.”

Q4. Did being stopped affect how you saw yourself, or how you felt others saw you?

Prompts if needed:

- Did it change how you felt about your place in your community or in Britain more broadly?
- Did it make you think differently about how society sees young people like you?
- Did it influence how you thought about your future?

6. Emotional and psychological impact

Interviewer note: ask follow-up prompts only where the participant indicates the experience had an emotional or ongoing impact.

Q5. How did you feel during those encounters? (e.g. scared, angry, embarrassed – or however you would describe it)

Prompts if needed:

- *What was going through your mind at the time?*
- *Did you feel in control of the situation?*

Q6. Did those feelings stay with you afterwards?

Prompts if needed:

- *Did those feelings fade, build up, or come back later?*
- *Did the experiences affect your sense of safety or mental health over time?*
- *Did you notice changes in your mood, sleep, or confidence after these experiences?*

7. Perceptions of fairness and legitimacy

Q7. Overall, how did you feel you were treated during those encounters — were you treated with respect?

Prompts if needed:

- *Were there moments where you felt treated well, or moments where you felt disrespected?*
- *Do you think how you were treated depended on the individual officer?*
- *Did these experiences affect your trust in the police or other authority figures (e.g. teachers/ employers)?*

8. Behavioural and social responses

Q8. Did being stopped change your behaviour, routines, or relationships in any way?

Prompts if needed:

- *Did it change where you went, who you spent time with, or what you carried?*
- *Did it affect your engagement at school, or how teachers or other adults treated you?*
- *Do you think it made you more or less likely to get involved in crime?*
- *Do you think it had any longer-term effect on your education, job opportunities, or how authorities dealt with you later on?*

9. Coping mechanisms and support

Q9. Who, if anyone, did you turn to after being stopped — and was there anything that helped you process what happened?

Prompts if needed:

- *Were there things you did on your own that helped, even temporarily?*
- *Were there any people or organisations that offered support?*
- *What kinds of support do you think young people need after such experiences?*

10. Views on policing now

Interviewer: "I'm now going to ask about how you feel about the police now – how you see things today, and any longer-term effects of your experiences with them."

Q10. When you think about the police now, how do you feel — and do you think your stop and search experiences shaped those views?

Prompts if needed:

- *If you needed help or felt unsafe, would you go to the police? Why or why not?*
- *Do you think stop and search is generally carried out fairly in your community?*
- *Do you think stop and search reflects wider inequalities in society?*
- *If you could describe the relationship between police and young people in your community in one sentence, what would it be?*

11. Reflections and recommendations

Q11. Is there anything you wish the police had done differently — what do you think would make stop and search encounters better for young people more broadly?

Prompts if needed:

- *What advice would you give to police officers who work with young people?*
- *Do you think officers need more training in any areas? (e.g. mental health, how young people react under stress)*
- *What changes do you think could improve trust between young people and the police?*
- *What do you wish people understood about young people who are stopped and searched?*

12. Closing and debrief

Q12. Is there anything we haven't talked about that you'd like to add?

- Thank the participant warmly. Acknowledge that some of what was discussed can be difficult, and that their experiences are valid and important.
- Check in: "How are you feeling after talking about this today?"
- Remind them they can withdraw their responses or follow up after the interview if they wish.
- Provide information about available support resources (e.g. mental health charities, youth organisations).

Interview Schedule: growing up in an overpoliced environment

1. Introduction and rapport building

- Welcome the participant, thank them for taking part, and remind them that participation is voluntary – they can stop or skip any question at any time without giving a reason.
- Reassure them that everything they share will be kept confidential and anonymised.
- Explain this will be a relaxed, informal conversation. Provide information about available support services.

Study explanation (read or paraphrase):

“We’re speaking with young people who grew up in areas with a high level of policing, to understand how that environment may have affected them. We recognise that policing does not affect all communities in the same way, and that experiences can be shaped by race, ethnicity, gender, age and where someone lives. You don’t need to have been stopped yourself to take part — we’re interested in what it felt like to grow up in that environment more broadly. There are no right or wrong answers — please share whatever feels true for you. We can take breaks at any time, and you don’t have to answer any question you don’t want to.”

2. Background and context

Q1. Can you tell me a bit about yourself and what it was like growing up in your area?

Prompts if needed:

- *How would you describe the area? What were the people like? What did young people tend to do?*
- *How visible was the police presence where you grew up?*
- *Did you notice differences in how police interacted with different groups of young people in your community?*

Q2. Would you say that this area was heavily policed? What does that mean to you?

3. Family and early influences

Interviewer: introduce this section gently – “I’d like to ask a few questions about people around you growing up – feel free to skip anything you’d rather not answer.”

Q3. Growing up, what kinds of things — if any — did people around you say or know about the police?

Prompts if needed:

- *Did people around you — family, friends, neighbours — have encounters with the police? What, if anything, did they share about those experiences?*
- *Did anyone give you advice about how to behave around the police?*
- *Do you think young people from all backgrounds receive similar advice, or is it different for some groups?*
- *Did what you heard or saw from others shape how you felt about the police?*

4. Experience of living in an overpoliced environment

Interviewer: “I’m now going to ask about what it felt like to grow up in an area with a strong police presence. You don’t need to have been stopped yourself — we’re interested in what that environment was like for you day to day.”

Q4. What was it like growing up in an area with a strong police presence — how did that feel as part of everyday life?

Prompts if needed:

- *Were there particular places, times, or situations where you were especially aware of the police?*
- *Did the police presence ever affect what you did, where you went, or who you spent time with?*
- *Did you ever feel watched, targeted, or treated with suspicion, even without being stopped?*
- *Did you feel certain factors — such as your race/ethnicity, age, clothing, or gender — affected how police saw you or your peers?*
- *Did you witness others — friends, family, or people in your community — being stopped? What was that like to see?*

5. Self-perception and identity

Interviewer: “I’d like to ask whether growing up in that environment had any effect on how you saw yourself. People’s experiences vary greatly — we’re just interested in yours.”

Q5. Did growing up in area with a strong police presence affect how you saw yourself, or how you felt others saw you?

Prompts if needed:

- *Did it shape how you felt about your place in your community or in Britain more broadly?*
- *Did it make you think differently about how society sees young people like you?*
- *Did it influence how you thought about your future?*

6. Emotional and psychological impact

Interviewer note: ask follow-up prompts only where the participant indicates the environment had an emotional or ongoing impact.

Q6. How did police activity in this area make you feel?

Prompts if needed:

- *Were there times when the police presence made you feel anxious, unsafe, or on edge?*
- *Did it affect your general stress levels or sense of freedom in day-to-day life?*
- *Did the environment affect your confidence, sense of safety, or mental health?*

Q7. Did those feelings stay with you over time?

Prompts if needed:

- *Did those feelings fade over time, or did they build up or come back?*
- *Did you notice any changes in yourself over time — in your mental health, mood, confidence, or how you interacted with others?*

7. Perceptions of fairness and legitimacy

Q8. Growing up, did you feel that the police presence in your area was fair and justified — or not?

Prompts if needed:

- *Did you feel the level of policing was proportionate to what was actually happening in your area?*
- *Did you ever witness police treating people unfairly or disrespectfully?*
- *Did your views differ from those of people around you — family, friends, or neighbours?*
- *Did the way policing was carried out in your area affect your trust in the police or other authority figures?*

8. Behavioural and social responses

Q9. Did police activity in this area change your behaviour, routines, or relationships in any way?

Prompts if needed:

- *Did it change where you went, who you spent time with, or how you presented yourself?*

- *Did it affect your engagement at school, or how teachers or other adults treated you?*
- *Do you think the environment made you or your peers more or less likely to get involved in crime?*
- *Do you think it had any longer-term effect on your education, job opportunities, or how authorities dealt with you later on?*

9. Coping mechanisms and support

Q10. Was there anything or anyone that helped you deal with what it was like growing up in that environment?

Prompts if needed:

- *Were there things you did on your own that helped, even temporarily?*
- *Were there people — family, friends, community figures — or organisations that offered support or guidance?*
- *What kinds of support do you think young people in areas with similar police activity need?*

10. Views on policing now

Interviewer: “I’m now going to ask about how you feel about the police now – how you see things today, and any longer-term effects of growing up in that environment.”

Q11. When you think about the police now, how do you feel — and do you think growing up in an area with a strong police presence shaped those views?

Prompts if needed:

- *If you needed help or felt unsafe, would you go to the police? Why or why not?*
- *Do you think stop and search is generally carried out fairly in communities like yours?*
- *Do you think the level of policing in your area reflected wider inequalities in society?*
- *If you could describe the relationship between police and young people in your community in one sentence, what would it be?*

11. Reflections and recommendations

Q12. What do you think would make policing in areas like yours better for the young people who live there?

Prompts if needed:

- *What advice would you give to police officers who work in areas like yours?*

- *Do you think officers need more training in any areas? (e.g. mental health, how young people react under stress, bias)*
- *What changes do you think could improve trust between young people and the police?*
- *What do you wish people understood about what it is like to grow up in an area with high police activity?*

12. Closing and debrief

Q13. Is there anything we haven't talked about that you'd like to add?

- Thank the participant warmly. Acknowledge that some of what was discussed can be difficult, and that their experiences are valid and important.
- Check in: "How are you feeling after talking about this today?"
- Remind them they can withdraw their responses or follow up after the interview if they wish.
- Provide information about available support resources (e.g. mental health charities, youth organisations).