Understanding ethnic disparity in reoffending rates in the youth justice system

Analysis of reoffending data

TRAVERSE

Contents

Acknowledgements

Disclaimer

The views expressed are those of the authors and do not necessarily reflect those of the Youth Justice Board.

Foreword

For some time, including before my tenure at the YJB, I have highlighted the significant issue of racial disparity in the youth justice system, and it remains of huge concern to me. We know that systemic and institutional prejudices impact on the likelihood of a child entering the youth justice system and even influence the treatment they receive once there.

Of course, a lot happens before a child comes into contact with the youth justice system and the reasons are complex and intersectional. Nevertheless, complexity is not an excuse for inaction or giving up. It's a challenge, and one that we must collectively meet.

One area that requires our close attention is the disparity we see in proven reoffending rates for children from different ethnic minority groups. Our youth justice statistics for 2021 to 2022 showed that despite decreases in reoffending rates across all children over the last five years, the reoffending rate was highest for Black children. This has been consistent over the last ten years.

We needed to understand more about this issue and so commissioned Traverse, an independent research organisation, to conduct a research study to examine what may be driving the disparity in rates of reoffending.

The research involved statistical analysis of reoffending data from England and Wales, interviews with children from England as well as focus groups with youth justice service practitioners.

The findings are published in two parts, a **Child and practitioners perspectives** report and an **Analysis of reoffending data** report. Both are published today and should be read together. This is important to ensure a full appreciation of the data alongside the contextual factors affecting children from certain ethnic minority groups.

The analysis of reoffending data aimed to assess the extent to which differences in reoffending outcomes can be explained by differences in other demographic and offence-related factors, and practitioner assessed factors, that the YJB holds data on. It should also be noted that the data is grouped to the five aggregated ethnic groups and does not show the groups separately. We understand, therefore, that this analysis represents a simplification of a complex picture of diversity.

Specifically, the statistical analysis suggests substantial disparities in reoffending rates:

- A higher-than-expected re-offending rate for children from a Black or Mixed heritage background compared to White children, even after various contextual factors – such as offence type, local area deprivation, practitioner assessment of risk, and previous disposal - are taken into account.

- A lower-than-expected re-offending rate among those from an Asian / Chinese background compared to White children.

It also uncovered disparities in disposals following reoffending:

- Children from a Black, Asian or Mixed heritage background are more likely to receive a custodial sentence following reoffending compared to White

children, even after similar contextual factors – such as offence type, practitioner assessment of risk, previous disposal – are accounted for.

Though this analysis helps us understand more about the patterns of reoffending, it only provides a partial picture. The children and youth justice practitioners who kindly took part in the research shared their views of what may be driving higher rates of reoffending, these center around the following themes:

- Marginalisation and exclusion from education and other support systems.
- Wider social inequalities, including poverty and local deprivation.
- Individual, institutional, and systemic bias. This includes the growing identification of adultification, where children from ethnic minority backgrounds in the youth justice system are often treated as adults.
- Weaknesses in prevention and diversion.
- Negative experiences of the wider criminal justice system.

This is often uncomfortable reading, and these insights demonstrate we clearly have some way to go if we are to achieve equity of treatment for all children in the youth justice system. It is therefore vital we recognise the wider structural and systemic challenges some ethnic minority children can and do face. We must also put these findings in the context that most ethnic minority children and adults have no contact with criminal or youth justice systems.

Unfortunately, children and practitioners from Wales were not included in the *Child and practitioner perspectives* sample, our accompanying analyst note provides more detail on the research and its limitations. We nevertheless anticipate that the findings will be of interest to those in the Welsh youth justice system.

The report authors have made a number of recommendations in relation to education, the importance of tailoring interventions to children's individual needs, interests, and aspirations and the diversity of the workforce.

I am pleased that work is already underway at the YJB to meet several recommendations set out in the report.

Education

- We have identified education as one of our areas of focus within the youth justice system for 2023/24 where we will deliver targeted pieces of work to drive improvement. We want to support children's increased access to high quality education, training and employment to support the development of a pro-social identity. We will also continue to support and share learning from the Department for Education's Alternative Provision Specialist Taskforce and the Support, Attend, Fulfil, Exceed (SAFE) multi-disciplinary pilots to support children within education placements.

Individual and institutional bias

- We are collaborating with the Workforce Development Council and have developed Elevate, a middle-manager positive action programme for under-represented groups. Elevate is a six-month mentoring programme designed to support the progression of middle managers from ethnic minorities (including

White minorities) into strategic management - where they are currently under-represented.

- We are also collaborating with the Workforce Development Council to develop a Youth Justice Apprenticeship and Positive Action Programme which will offer additional support to individuals from ethnic minority groups, those that have lived experience of the youth justice system and care leavers.
- In addition, we continue to work with the Magistrates Association to support the sector to develop and implement a joint national disparity protocol for racial disparity.

Prevention and diversion

- We have been working with the National Police Chiefs' Council (NPCC) and other key partners across England and Wales to update key diversion guidance documents which will align with Child First and Child Centred Policing and seek to avoid unnecessary criminalisation of children. This includes:
  - o The term out-of-court disposal to now incorporate both formal and informal out-of-court disposals and producing guidance to ensure children's needs can be met outside of the formal youth justice system wherever possible.
  - o Updates to the Child Gravity Matrix – the triage tool designed to support decision making for police officers to assist in deciding the most appropriate outcome or disposal for children who offend.
  - o The development of a standardised assessment tool for out-of-court diversion and prevention cases that will be housed on youth justice service's case management systems, to enhance data reporting and support the development of a national evidence base surrounding prevention and diversion work.

This is a significant piece of research which highlights some deeply concerning issues for all those working in the youth justice system. At the YJB, we remain determined to change the system, but we cannot change it alone. Our work with partners such as the police, courts, education services and youth justice services are important to us making any progress in this area. We will continue to work with key partners to address ethnic disparities and bias across the system to bring about change.

Keith Fraser

YJB Chair and Board Champion for Over-Represented Children

Executive Summary

Background

At the start of 2022, the Youth Justice Board (YJB) commissioned Traverse, an independent research organisation, to conduct a year-long research study into the drivers of ethnic disparity in reoffending rates in the youth justice system.

Overrepresentation of ethnic minority children in the youth justice system remains an enduring feature. An important but under-studied aspect of this feature is over-representation among those found reoffending – with Traverse's qualitative research on this theme being covered in the accompanying report "*Understanding ethnic disparity in reoffending rates in the youth justice system: Child and practitioner perspectives*".

That report, which drew on a range of interviews with YJS practitioners, and with children who have reoffended, found evidence of a perceived marginalisation of individuals and communities. It highlights perceptions of lower expectations by those in public services for desistance by children from ethnic minorities, with 'over-policing' and school exclusion often being prime factors perceived to be enablers of reoffending. At the same time, the report observes a perceived tendency to institutional bias. It finds experiences of overlooked and misunderstood needs among schools and youth services, as well as court decisions that are frequently perceived to be inequitable towards those with an ethnic background.

The focus of this report is to deploy quantitative analysis to complement those insights. We examine whether there are indications of unwarranted disparities in outcomes for different ethnic groups for those children who reoffend.

To do so, we use system-wide data from England and Wales on a cohort of 14,500 children (95% from England, 5% from Wales) aged 10 to 17 who entered the youth justice system through a first offence during the period April 2018 to March 2020.

Such data has only recently become available at the quantities that potentially make relatively robust analysis achievable. However, this is a complex agenda, with key data sources on factors often incomplete. Consequently, this should be taken as a preliminary investigation, with results that must be viewed as provisional and consequently would benefit from additional exploration in future.

Levels of reoffending among children from different ethnic backgrounds

Of the 14,500 children in our data set, some 5,500 (38.2%) reoffended between their first offence and March 2022. The level of proven reoffending varied substantially between those of different ethnic groups, with a rate of 32.0% for those children with an Asian/Chinese background[1], a rate of 36.7% for those with a White background, and a rate of 46.9% for those from a Black background.

The substantially different rates of reoffending by ethnic group are in line with the different rates in reoffending visible in Youth Justice Board (2023)[2] for those entering the youth justice system in 2018 and 2019 (it should be noted that a significant, encouraging, reduction in reoffending rates is visible across all ethnic groups between 2019 and 2021, but this was outside the period covered by our data set).

Such statistical differences are, therefore, perhaps not surprising - but they provide impetus for investigation as to whether different reoffending rates occur for different ethnic groups once contextual factors have been taken into account.

Factors associated with reoffending

We undertook a form of multi-variate statistical analysis known as logistic regression in order to assess the likelihood of reoffending while taking contextual factors into account. We modelled six types of influence on the expected probability of reoffending, namely:

1. the type of offence and whether there were convictions on more than one type of offence;
2. estimated risk of reoffending (as determined by the YOGRS[3] score);
3. demographics factors (age, gender, ethnic background);
4. wider social aspects (population density, social deprivation, social capital in the area);
5. characteristics of the youth justice system; and
6. characteristics of the individual (such as whether they had ever experienced care).

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[1] Note that in relation to ethnic background, though children from a Chinese background are reported separately in the AssetPlus database, due to low numbers we included them in a combined Asian/Chinese ethnic background category.

[2] See Figure 9.5 of Youth Justice Board (2023) '*Youth Justice Statistics 2021-22*', Youth Justice Board for England and Wales

[3] The Youth Offender Group Reconviction Scale (YOGRS) score estimates the probability that offenders will be re-sanctioned for an offence (including out-of court disposals) within two years of sentence (or release if sentenced to custody).

Findings of quantitative analysis of factors influencing level of reoffending

Our logistic regression analysis found, for the 2018 to 2020 cohort of children who have committed a first offence:

- A very strong link between practitioners' assigning a higher initial assessment of the risk of reoffending (YOGRS), risk of serious harm (ROSH) and actual higher rates of reoffending

- The type of crime influences the likelihood of reoffending, with those undertaking fraud and forgery much more likely to reoffend than others

- A strong link between either being in care or having been in care and higher rates of reoffending

- A close link between lower levels of reoffending and positive attitudes on learning and employment, and similarly a link between less reoffending and positive perspectives on parenting, family and relationships

- Those children from a Black or Mixed background are, respectively, 20% and 16% proportionally more likely to reoffend compared to children from a White background, after the above contextual factors (such as YOGRS and attitudes to learning and employment) have been taken into account. For a baseline reoffending rate of 36.7% for children from a White background, this implies a reoffending rate of the order of 44% for those from a Black background, and 43% for those from a Mixed background.

Analysis of types of disposals given to children who reoffend

Of those that reoffended, 17.0% (around 940) were given custodial sentences. As with reoffending rates, we observed substantial differences in outcomes between ethnic groups, with a clear tendency for more stringent disposals for those from a Black or Asian background compared to those with a White background. Custody was imposed for 23.3% of children from an Asian background, 25.1% of those with a Black background, and 13.7% among those with a White ethnic background. First-tier sentences[4] were given to 16.0% with a Black background, compared to 25.8% from a White background.

This is a similar picture to that reported for sentencing as identified in ZK Analytics and YJB (2021)[5], and again indicates solid grounds for undertaking further investigation as to whether different rates of custody occur for different ethnic groups once contextual factors have been taken into account.

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[4] In relation to sentences given by the court, first-tier penalties relate to bind over, discharges, fines and deferred sentences. First-tier penalties are less serious than community-based penalties, which in turn are less serious than custodial sentences.

[5] ZK Analytics and YJB (2021) '*Ethnic disproportionality in remand and sentencing in the youth justice system*', Youth Justice Board for England and Wales

We undertook logistic regression using the same six explanatory factors as for assessments of the risk of reoffending. Our analysis found the following statistically significant relationships:

- The greater practitioners' initial assessments of the risk of reoffending (YOGRS) or risk of serious harm (ROSH), the greater the likelihood of implementation of a custodial sentence

- Custody for a first offence makes it almost four times more likely that there will be a sentence of custody on reoffending, while previous use of community sentences at first offence increases the likelihood of custody by around 75%

- There is a far greater likelihood for a child from an Asian/Chinese, Black or Mixed background to receive a custodial sentence, over and above these factors – compared to a custody rate of 14% for those from a White background, our analysis of relative propensity suggests custody rates of 21% for those from an Asian/Chinese or Black ethnicity, and 18% for those from a Mixed background.

Limitations of the analysis

It is important to note that the results set out in this study should be treated with caution. The extent to which the statistical model was able to "fit" the data was relatively low, and there are substantial drawbacks to the data that was available:

- The AssetPlus data that was utilised is focussed on its assessment tool purposes, and is not intended to be used as a comprehensive record, so it is often incomplete. Future research may be able to draw on improved data and/or further analysis as to any bias in missing data;

- There was no data recorded as to any offences prior to April 2018. This cut-off point will become less of a factor in future analyses;

- There is no data on geographical area beside the recording of which Youth Justice service is relevant to the given child. This means that only broad-brush aggregate local data is available;

- The data set could not be linked to Data First (in particular, its records on Crown Courts / Magistrates Courts, and its assessment of the seriousness ("Gravity") of an offence or to records as to whether Joint Enterprise was a factor. This meant that we were unable to take into account these factors.

Conclusions

Our analysis suggests substantial, statistically significant differences in reoffending rates among different ethnic groups.

We observe a higher-than-expected reoffending rate for children with a Black background, even after various contextual factors are taken into account. This is in line with the findings reported in the accompanying Traverse qualitative report

"*Understanding ethnic disparity in reoffending rates in the youth justice system: Child and practitioner perspectives*", that compared to those with a White background, there is a systematic tendency towards 'over-policing', school exclusion, and overlooked and misunderstood needs by youth support, and youth justice system alike. While the latest Youth Justice Statistics (Youth Justice Board 2023[6]) showcase encouraging trends, the evidence of this report suggests that continued efforts to address bias should be maintained and increased.

More positively, we also observe a lower-than-expected reoffending rate among those with an Asian or Chinese background, and further research on this group may present potentially useful policy lessons.

Also on a positive note, constructive attitudes towards learning and employment, and positive perspectives on family and relationships, appear to play a very useful role in reducing reoffending. This reinforces the need to continue to promote and facilitate education and career aspirations, and to support positive relationships.

Other factors, however, appear to exacerbate the potential for reoffending – in particular whether a child is in care or has been in care. The strong relationship between care status and reoffending highlights the importance of particular focus on meeting their needs when considering ways to address reoffending.

Turning to decisions on custody for children that reoffend, we observe that the likelihood of custody can increase proportionally by half[7] for those from an ethnic minority group compared to those with a White background – even after contextual factors are taken into account. This is a sign of systematic disparity.

Lastly, we have noted that there are substantial gaps and weaknesses in the information available for analysis, and we believe that steps should be taken to address this. At the same time, the data-set has information that could potentially be used to identify particular places or particular circumstances where disparities are greatest, as a supporting action to underpinning improvements.

Recommendations

In terms of improvements to data quality, we recommend that action be undertaken to:

- Facilitate linking to Data First and data on joint enterprise charges
- Improve the proportion of AssetPlus assessments completed

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[6] See Figure 9.1, Youth Justice Board (2023) '*Youth Justice Statistics 2021-22*', Youth Justice Board of England and Wales

[7] The relative increase in risk, compared to those from a White background, is 52% for those from a Black ethnic background, and 54% for those from an Asian/Chinese background

- Improve data collection as to diversity of staff among police and the judiciary, and assessing the impact of such diversity
- Explore improvements in data collection on mental health, and assessing the impact of mental health on outcomes in more detail.

Improvements in data would enable better understanding of factors influencing ethnic disproportionality and facilitate better monitoring of changes over time.

Turning to potential data analytics, we recommend consideration of analysis of differences in reoffending rates and custody rates:

- By region and/or local justice service area,
- By circumstances of interest (for example, by type of crime)
- Over time, since by comparing patterns between 2018/19 – 2019/20 and 2021/22, there may be lessons to learn as to how the substantial improvements in disparity in reoffending rates can be sustained.

Lastly, we have noted adverse disparities among ethnic groups in relation to outcomes for custody on reoffending. Continued efforts to reduce adverse disparity should be undertaken, possibly supported by the introduction of benchmark information and enhanced training, for those making and influencing the decisions.

Introduction

Background

At the start of 2022, the Youth Justice Board (YJB) commissioned Traverse, an independent research organisation, to conduct a year-long research study into the drivers of ethnic disparity in reoffending rates in the youth justice system.

Overrepresentation of ethnic minority children in the youth justice system remains an enduring feature. Yet, the complex and multiple drivers of reoffending and how they might be specific to children from ethnic minorities (including White minorities) has received relatively little research attention.

The Lammy Review into the treatment of, and outcomes for, ethnic minorities in the British Criminal Justice System highlighted the scale of the reoffending issue. Data from 2017 showed that 36-44% of convicted children would reoffend within one year of completing their sentence, compared to 29-32% of adults.

This same data also demonstrated a substantial ethnic disparity that is the primary focus of this research: as many as 45% of Black children were expected to reoffend within 12 months of release from custody or receipt of a non-custodial conviction, reprimand, or warning.[8]

Subsequent analysis commissioned by the Youth Justice Board (ZK Analytics and YJB 2021)[9] confirmed there were substantial divergences in experiences between different ethnic groups.

That study did not, however, focus on the important theme of reoffending. This has been partly addressed by the accompanying Traverse qualitative report "*Understanding ethnic disparity in reoffending rates in the youth justice system: Child and practitioner perspectives*". That report, which drew on a range of interviews with YJS practitioners, and with children who have reoffended, found evidence of a perceived marginalisation of individuals and communities. It highlights perceptions of lower expectations by those in public services for desistance by those from ethnic

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[8] Lammy Review (2017) '*The Lammy Review: An independent review into the treatment of, and outcomes for, Black, Asian and Minority Ethnic individuals in the Criminal Justice System*', Lammy Review. Accessible at www.gov.uk/government/news/lammy-publishes-historic-review

[9] ZK Analytics and YJB (2021) '*Ethnic disproportionality in remand and sentencing in the youth justice system: Analysis of administrative data*', Youth Justice Board for England and Wales

minorities, with 'over-policing' and school exclusion often perceived to be prime enablers of reoffending[10].

This report undertakes quantitative analysis to supplement consideration of the themes raised by that report.

It uses AssetPlus data on a cohort of around 15,000 children aged 10 to 17 who offended during the period April 2018 to March 2020, of whom some 5,500 (approximately 38%) reoffended between their first offence and March 2022[11]. In order to maximise data points we have considered reoffending over the whole period (rather than reoffending within a set timeframe such as one or two years).

Our final consideration in relation to this Background section is to highlight the considerable debate around concepts and categories of ethnicity and race. Only a very limited number of official categories is used in the AssetPlus data to describe ethnic groupings, and consequently our analysis represents a considerable simplification of a complex picture of diversity.

Remainder of this report

We next move to consideration of statistical analysis to assess the underlying features of patterns observed in tables above. In the remainder of this report, we consider:

- Descriptive statistics on reoffending rates and custodial sentences
- Methodology for analysis
- Data for statistical analysis
- Results of analysis
- Discussion and recommendations

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[10] Further evidence for flaws in the processes adopted by schools and police comes from Runnymede Trust (2023) '*Over-policed and under-protected: the road to Safer Schools*', Runnymede Trust (accessible at www.runnymedetrust.org/publications/over-policed-and-under-protected-the-road-to-safer-schools). It assesses a clear tendency for Safer Schools Officers to be based in schools "in areas with higher numbers … of Black and ethnic minority students"; it further cites analysis in Children's Commissioner (2022) '*Strip search of children by the Metropolitan Police Service – new analysis by the Children's Commissioner for England*' Children's Commissioner for England, that 58% of all strip searches conducted by the Metropolitan police 2018-2020 were conducted on Black boys.

[11] Note: this approach differs from the standard methodology of checking whether a given offender has reoffended at a certain milestone (and so the statistics quoted here are not directly comparable with those reported in the Youth Justice Board's '*Youth Justice Statistics*'). However, by using data for the full time period of the data-set, we are able to draw on as large a data-set as possible in order to increase the robustness of our findings.

Descriptive statistics

Source of data on children that offend / reoffend

As noted in the Introduction section to this report, our main source of data on children that reoffend is AssetPlus data for the period <u>April 2018 to March 2022</u> (AssetPlus is an assessment tool, designed to provide an end-to-end assessment and intervention plan)[12].

We have utilised data –

(a) relating to those aged 10 to 17 who have reoffended (which we have taken to occur when a second offence is noted in the database with an outcome date that is more than 30 days after the first identifiable outcome date) [13].

(b) relating to those aged 10 to 17 who have offended during the period April 2018 to March 2020 (this cut-off point enables us to identify reoffending on a timescale of at least two years for all individuals who committed a first offence)

(c) that excludes those children who were convicted of Breach offences at their first entry into the database, on the grounds that they were known to the youth justice system prior to that entry

Apart from the caveat relating to criteria (c), we have assumed that the first time that a child appears in the database the record relates to their first offence (this is not necessarily the case, however, and our understanding is that further work on updating the YJB datasets is underway).

Further details on data (including the groupings of offences between first tier, community sentences and custodial sentences) are provided in the section "Data for Statistical Analysis).

It is important to note that caution should be exercised when interpreting figures from AssetPlus data, given the type of data and the purpose for which it is collected (since its data is not recorded for statistical or internal performance reporting).

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[12] It should be noted that the assessments in AssetPlus are not necessarily objective – they take place after interactions between the child and at least three agencies (education, police and courts), and there is the potential for bias (conscious or unconscious) in each.

[13] This is a simplified process for assessing re-offending compared to the official methodology, which uses a more rigorous definition that can be undertaken with integrated data sources. Consequently, the re-offending rates set out in this study are not directly comparable with those reported in official statistics.

Reoffending rates – ethnic group

Two key questions are:

- How do offending rates vary for those from different ethnic backgrounds?
- What is the *relative* propensity for those children from a given ethnic background who have offended to reoffend?

We calculate the "Relative propensity" of a child from a given ethnic background reoffending compared to a child from a White background as (the proportion of the children from that ethnic group who reoffend) divided by (the proportion of children from a White background who reoffend).

Table 1 below shows reoffending rates in relation to five ethnic background groups (note that a Chinese background is identified separately in the database, however we have grouped children with this background with those with an Asian background due to low numbers).

We observe a relative propensity (compared to those children from a White background) varying from 0.87 (calculated as 32.0% divided by 36.7% in the case of those from an Asian or Chinese background), to 1.28 (for those from a Black background). This means, for instance, that Asian/Chinese children appear to be 13% less likely to reoffend than those from a White background. Note that the statistics for "Total" includes a relatively small number of children for which we do not have data on ethnic background.

Table 1 Descriptive statistics on reoffending rates by ethnic group

	[+] Reoffending rate	Ratio (White background = 1.0)
Asian or Chinese[++]	*32.0%	0.87
Black	**46.9%	1.28
Mixed	**44.2%	1.20
Other	35.0%	0.95
White	36.7%	1.00
Total	38.3%	1.04

(Note: [+] figures not directly comparable with Lammy Review (2017) as reoffending calculated on a simplified basis which may slightly over-report, due to potential for some children charged of multiple crimes to have hearings whose dates differ by more than 1 month)

(Note: [++] children with a Chinese background have been grouped in with those from an Asian background due to low numbers)

(Note: * level lower than those with White background - statistically significant result based on 95% confidence interval; ** level higher than those with White background - statistically significant result based on 95% confidence interval)

Using a methodology described in Morris and Gardner (1988)[14], we calculate the 95% confidence intervals for the relative risk ratios. These indicate that there is a statistically significant increase in the risk of reoffending for those from a Black or Mixed ethnic background compared to a White background; and a statistically significant decrease in relation to those with an Asian or Chinese background.

Decisions on chosen form of disposal for children who reoffend - rates by ethnic group

We next turn to the forms of disposal received by children who have reoffended.

Using the same AssetPlus data as for analysis of reoffending rates, we have reviewed outcomes of three possible types of legal outcomes for children who were found to have reoffended. Adopting a categorisation incorporated into the Local Level tables published alongside the annual Youth Justice statistics[15], we have assessed the proportions given First tier, Community, or Custodial sentences.

Table 2 below shows the proportions who received First-tier sentences for the five different ethnic backgrounds that we considered (note that, as previously, a child with a Chinese background is included in the Asian or Chinese group due to low numbers). It shows a range from 16% for those with a Black background, to a level of 26% for those with a White background.

Table 2 Descriptive statistics on first-tier disposals by ethnic group

	% of ethnic group given first tier	Ratio (White background = 1.00)	Difference compared to White background
Asian or Chinese	20.3%	0.78	-22%
Black	16.0%	*0.62	-38%
Mixed	19.8%	*0.77	-23%
Other Ethnic Group	21.5%	0.83	-17%
White	25.8%	1.00	0%
Not known			
Total	23.1%	0.89	-11%

(note: * represents a statistically significant reduction in probability compared to those children from a White background based on 95% confidence interval)

We calculate the Ratio of receiving a First-tier disposal for a given ethnic background by dividing the proportion of that ethnic group given a First-tier disposal by the proportion of a White ethnic background receiving a First-tier disposal.

We observe a relative likelihood of -38% for a first-tier sentence to be given to children from a Black background compared to a White background (as the ratio is calculated as 16.0% ÷ 25.8% = 0.62, which is 38% below "base rate"). This lower level

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[14] Morris and Gardner (1988) "Calculating confidence intervals for relative risks (odds ratios) and standardised ratios and rates", *BMJ* 296(7) pp. 1313 - 1316

[15] see for example Local Level pivot tables, accessible at www.gov.uk/government/statistics/youth-justice-statistics-2020-to-2021

is statistically significant (assessed using the same methodology as previously), and the same holds for the relative risk of -23% for those from a Mixed background.

The next form of sentencing we consider relates to custody.

We calculate the risk of receiving a custodial sentence for a given ethnic background by dividing the proportion of that ethnic group given custody by the proportion of a White ethnic background given custody.

In the case of those with an Asian or Chinese background, for example, there is a 70% higher risk (since 23.3% ÷ 13.7% = 1.70, and this represents a 70% increase on base-line). The results are shown in Table 3 below.

Table 3 Rates of custody disposals by ethnic group

	Proportion of ethnic group given custody	Ratio (White background = 100%)
Asian or Chinese	23.3%	*1.70
Black	25.1%	*1.82
Mixed	20.2%	*1.47
Other Ethnic Group	18.3%	1.33
White	13.7%	1.00
Total	17.0%	1.23

(note: * represents a statistically significant increase in probability compared to those children from a White background based on 95% confidence interval)

Tables 2 and 3 show striking, statistically significant differences in the forms of disposal given to those from different ethnic backgrounds as a whole. However, before coming to conclusions of bias, it is vital to take contextual factors into account (such as the type of offences committed), before looking to attribute any such considerations. We therefore turn to a Methodology and Data sources to conduct such a quantitative analysis.

Methodology for analysis

Factors that influence the level of reoffending and the type of disposal for those children that reoffend

Our framework for analysis draws on insights from YJB statistical analyses, our accompanying qualitative report, and other literature.

Youth Justice Board (2023)[16] highlights, in relation to reoffending rates, major differences by type of criminal activity (section 9.5), and type of previous disposal (section 9.6); it also highlights major differences in relation to the demographic factors of gender and age (section 9.3).

More broadly, Public Health England (2019)[17] – which draws on research frameworks such as Hawkins et al (2000)[18] – makes clear that reoffending is influenced by a complex array of factors, occurring at many different levels - individual factors, family factors, school factors, peer-related factors and community and neighbourhood factors.

Of these, AssetPlus and the associated Youth Offender Group Reconviction Score (YOGRS) take into account a variety of features, among them individual factors, family factors, school factors, peer-related factors. Such factors can be both positive and negative – for example a report on the evidence for a "Child first" approach, Case and Browning (2021)[19] cites a variety of protective factors such as a "future-focussed" perspective on education, training and employment options (p45).

By contrast, an important negative factor is referral to Children's Services. According to Department for Education and Ministry of Justice (2022)[20], 32% of those cautioned or sentenced for an offence, and 38% of children cautioned or sentenced for a serious violence offence were a child in need, while 60% of those whose offending had been prolific had been a child in need.

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[16] Youth Justice Board (2023) '*Youth Justice Statistics 2021/22*' Youth Justice Board for England and Wales

[17] Public Health England (2019) '*Collaborative approaches to preventing offending and re-offending by children',* Public Health England, accessible at www.gov.uk/government/publications/preventing-offending-and-re-offending-by-children/collaborative-approaches-to-preventing-offending-and-re-offending-by-children-capricorn-summary#risk-factors-and-protective-factors

[18] Hawkins, D. et al (2000) 'Predictors of youth violence', *Juvenile Justice Bulletin* (April 2000), Office of Juvenile Justice and Delinquency Prevention, US Department of Justice

[19] Case, S. and Browning, A. (2021) "*Child First Justice – The Research evidence-base*", Loughborough University

[20] See page 12 of Department for Education and Ministry of Justice (2022), '*Education, children's social care and offending – descriptive statistics*', Department for Education and Ministry of Justice

AssetPlus and YOGRS do not, however, cover all the relevant community and neighbourhood factors that are potentially useful for the purposes of this study. In particular, social deprivation has been noted earlier in this report as correlated with reoffending, while our complementary study "*Understanding ethnic disparity in reoffending rates in the youth justice system: Child and practitioner perspectives*" reports both practitioners and children interviewees being clear that poverty and social class greatly influence offending and reoffending rates.

As noted earlier, the focus of AssetPlus is on providing an end-to-end assessment and underpin an intervention plan. Consequently, there are limitations in the application of its data to a broader research perspective. One potential limitation in this context is relationships within communities. These can potentially make a substantial difference to outcomes, with research reported in Albertson (2021) on desistance and social capital reporting a key role for three forms of social capital (relational and bonding social capital; cognitive and bridging social capital; and structural and linking social capital) as a means of assisting desistance.

Lastly, we also note that interventions by the youth justice system can adversely affect children. In a report on the evidence for a "Child first" approach, Case and Browning (2021) point to a general tendency for children who commit crime to 'grow out of it', but note that "formal processing by the YJS [rather than diversion at the point of arrest] can knock children off this natural trajectory of improvement". Case and Browning highlight "significant research evidence to support the theory that a positive relationship between the child and their YJS practitioner and/or a professional from another agency is more beneficial than the/any formal intervention in relation to desistance". Unfortunately, however, despite the considerable progress on first time entrants to the youth justice system identified in YJB (2023)[21], our companion report, "*Understanding ethnic disparity in reoffending rates in the youth justice system: Child and practitioner perspectives*", finds many children reporting that "services often saw it as inevitable that they would offend, based on their family background or where they grew up".

One possible driver for such perspectives outlined in "*Understanding ethnic disparity in reoffending rates in the youth justice system: Child and practitioner perspectives*" is a lack of diversity in practitioners. It notes, for example, that in courts there is "a distinct lack of diversity amongst judges, magistrates, and the panels called together to decide what action needs to be taken for the child …".

On the basis of the above, our conceptual model has six broad themes, relating to:

- ■ (1) offence history for the period April 2018 to March 2022 - the type of offence, whether there were convictions on more than one type of offence, and (for consideration in relation to type of disposal for children who have reoffended) the type of disposal given for a first offence. We also included an additional variable of time from the first offence date to March 2022 (the

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[21] See in particular Figures 2.1 and 2.3 of Youth Justice Board (2023) '*Youth Justice Statistics 2021/22*', Youth Justice Board for England and Wales

rationale here was that a child had a longer time to re-appear in the dataset the earlier that the first offence data occurred[22]).

- (2) estimated risk of reoffending as assessed by the YOGRS score (Youth Offender Group Reconviction Score);

- (3) demographics – age, gender, ethnic background;

- (4) the wider social context – social deprivation as measured by child poverty in the local YJS area and social capital (of which we have considered two potential measures with suitable disaggregation at local level);

- (5) characteristics of the youth justice system - in terms of trust in the local Police Force, and the proportion of staff in the local YJS from an ethnic minority background in years prior to the offence

- (6) characteristics and background of the individual in terms of care status, attitudes to learning & employment, and attitudes to family and relationships.

Details on the specific variables used to assess the given aspects of the themes are given in the subsequent Data section of this report.

Overall approach to analysis

Though much is known about individual factors (for instance, the relative reoffending rates of girls compared to boys), we need to undertake a form of analysis that can handle multiple and inter-acting effects.

Our choice of analytical approach is to use logistic regression, which is an approach often used in criminal justice studies into similar issues. For example, Brunton-Smith and Hopkins (2013)[23], a Ministry of Justice report, used logistic regression on the grounds that it "enable[d] examination of the association of particular offender, offence and sentence attributes with reoffending whilst controlling for the effects of other characteristics."[24]

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[22] This theme was also a consideration in determining a cut-off point for inclusion of a young person in the dataset of an age of 17 at the first offence date. Those aged over 17 were excluded from the analysis because the closer that children are to their 18th birthday, the greater the likelihood that any reoffending cannot be identified in AssetPlus.

[23] See page 9 of Brunton-Smith, I. and Hopkins, K. (2013) 'The factors associated with proven re-offending following release from prison: findings from Waves 1 to 3 of SPCR: Results from the Surveying Prisoner Crime Reduction (SPCR) longitudinal cohort study of prisoners', Ministry of Justice

[24] Stoltzfus, J. (2011) 'Logistic regression: a brief primer', Academic Emergency Medicine (18) (pp. 1099–1104) accords with this assessment, while noting significant caveats – "Logistic regression is an efficient and powerful way to assess independent variable contributions to a binary [yes/no] outcome, but its accuracy depends in large part on careful variable selection with satisfaction of basic assumptions [independence of errors, linear relationships, absence of multi-collinearity, lack of strongly influential outliers], as well as appropriate choice of model building strategy and validation of results ... "

We have undertaken five main steps in implementing the logistic regression process:

- **(1) Choice of variable to analyse as the independent variable**

  - For the model of reoffending, our chosen variable is the yes/no data point as to whether a given child re-appeared in the dataset. They were recorded as having reoffended if they both had a first offence date recorded between April 2018 and March 2020, and had a further offence date identified with at least a 30 day gap from the first offence date[25].

  - For the model on the decision of whether to order a custodial sentence, our choice of variable to analyse was the yes/no decision as to whether to deploy a custodial sentence upon reoffending

  (2) Choice of explanatory variables to include - we identified relevant data for the six categories of the conceptual model

- **(3) Undertake the logistic regression using the statistical package Stata in stages –**

  - Data was input into Stata from an Excel spreadsheet

  - Two models were assessed – one with Reoffending as the independent variable, with the other focussed on Custody after Reoffending

  - Where values to a given variable coincided with the "default" for that variable they were either set at zero (as with Male in relation to gender) or not included as a variable[26].

  - The first round of regressions used all relevant explanatory variables. In future rounds we removed variables that do not meet statistical confidence levels - we used a 10% significance level threshold initially

  - We ceased the rounds of regressions after arriving at a model that had statistical significance at a 5% level for all explanatory variables

- **(4) Undertake diagnostics** – we reviewed residuals from the logistic regression for outliers, and checked whether correlations between the variables were too close (and so potentially lead to an invalid assessment)

- **(5) Exclude outliers** from the data and re-running the equations as a diagnostic test

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[25] This is a more ad-hoc process for assessing re-offending than the official methodology, which uses a more rigorous definition that can be undertaken with integrated data sources. Consequently, the re-offending rates set out in this study are not directly comparable with those reported in official statistics.

[26] This occurred with "Violence against the person" in relation to crime type; White background in relation to ethnicity; First-tier disposal (disposal for first offence); and never having been in care (for care status). Removing data avoids the problem of variables being so closely correlated they affect the validity of results (an issue known as multi-collinearity)

Our final requirement was to assess the probabilities (a) for the base case; and (b) for the group that is not taken to be the default in the analysis. The stages were:

- (A) Take the coefficient for a variable of interest in the model

- (B) Calculate the exponential of that variable - which gives us the Odds Ratio associated with a one-unit increase in the variable

- (C) Assess the Relative Risk associated with the Odds Ratio by using a standard formula of adjustment[27].

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[27] The formula used is: Relative Risk = Odds Ratio / (1−baseline risk+(baseline risk ×odds ratio)), as set out in Grant, R. (2014) 'Converting an odds ratio to a range of plausible relative risks for better communication of research findings', *BMJ* 2014; 348 : f7450

Data for statistical analysis

In this section we cover (1) forms of data deployed in our analysis; and (2) data collation, anonymisation, and deletion.

Data deployed in our analysis

Below we consider key aspects of the explanatory variables in the analysis according to the six categories of our conceptual model set out in the Methodology section:

- (1) offence history - the type of offence, whether there were convictions on more than one type of offence, and type of disposal;

- (2) estimated risk of reoffending (initial assessment);

- (3) demographics – age, gender, ethnic background;

- (4) the wider social context;

- (5) characteristics of the youth justice system; and

- (6) characteristics and background of the individual.

We consider these in turn.

(1) The type of offence and disposal history

We included the following categories of type of offence from AssetPlus:

Arson
Criminal damage
Death or injury by dangerous driving
Domestic burglary
Drugs
Fraud and forgery
Motoring offences
Non domestic burglary
Public order
Racially aggravated
Robbery
Sexual offences
Theft and handling stolen goods
Vehicle theft
Violence against the person

Note that:

(i)   The most frequency category is "Violence against the person" (a category that applied to more than half the children considered), and so we used this as the default category for odds ratios for type of offence.

(ii)   To simplify the analysis, we initially assessed inclusion of a given crime category for a given child on a yes/no basis (rather than adding up the number of charges for that given category).

(iii) Breach of bail, Breach of conditional discharge and Breach of statutory order are also potential categories for AssetPlus, however we excluded cases of children where those categories applied as they represent a sign that the given case does not relate to a first time entrant.

Given our assessment of the types of offence committed by a child, we then calculated two sets of variables:

- (1) A variable of type of offence for a given child was given a score of 1 if one type of crime was committed, and apportioned between offences committed by the child if more than one type of crime was committed (for example, if a given child committed arson and robbery, then 0.5 was allocated to those crime categories, and 0 to others)[28]

- (2) A variable of multiple types of crime was created on a 1/0 basis, according to whether a child had committed two or more different types of crime or not (for example, a child who committed crimes of drugs and motoring offences would score a 1 on that basis).

We next consider types of disposal.

Each form of disposal has been categorised as either First-tier, Community or Custodial, as shown in Table 4 below. Our focus was on the disposal that occurred in relation to the first offence; where there were more than one type of disposal made, we recorded the most stringent tier if the disposals were of different tiers.

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[28] the rationale here is to provide a one/zero variable for each child's record to facilitate the logistic regression

Table 4 Disposals and allocation of group of disposal

Legal outcome	Tier
Attendance Centre Order	Community sentence
Community Punishment and Rehabilitation Order	Community sentence
Community Punishment Order	Community sentence
Community Rehabilitation Order	Community sentence
Community Rehabilitation Order and Conditions	Community sentence
Curfew Order	Community sentence
Detention and Training Order	Detention
Drug Treatment and Testing Order	Community sentence
Referral Order	First tier
Reparation Order	First tier
Section 226b	Detention
Section 226 Life	Detention
Section 226 Public Protection	Detention
Section 228	Detention
Section 250	Detention
Section 254	Detention
Section 259	Detention
Section 9091 detention	Detention
Section 9092 detention	Detention
Supervision Order	Community sentence
Supervision Order and Conditions	Community sentence
Youth Rehabilitation Order	Community sentence

(2) Estimated risk of reoffending

There are several potential variables that we have considered in including the risk of reoffending as assessed at the 1st offence – (a) the initial YOGRS assessment; (b) likelihood of reoffending as assessed by practitioner; (c) likelihood of reoffending as assessed by the child; and (d) ROSH risk of serious harm index.

We have used two of these metrics in our analysis - YOGRS score as our preferred metric for this category, on the various grounds that:

- YOGRS, since it widely available across the cohort, represents a precise quantification, and has a good correlation with reoffending

- Risk of serious harm (ROSH), since it incorporates further information as to the seriousness of the offences, while the other two likelihood metrics do not

(3) Demographics

The three variables that we included here were age in years (rounded to one decimal place), gender, and ethnic background. Note that in relation to ethnic background, though children from a Chinese background are reported separately in the AssetPlus database, due to low numbers we included them in a combined Asian/Chinese ethnic background category.

(4) Wider social context

We have considered population density, social deprivation and social capital as potentially useful contextual factors. All these factors were assessed at local authority level (since we have no data on geography beyond knowing the Youth Justice Service associated with the child).

Population density (by local authority, taken from ONS data). Our rationale for consideration of this variable is that there is potential scope for greater levels of crime to occur in more densely populated areas. A further point to note is that urban areas tend to be more heavily policed, as well as having a tendency to have a greater ethnic mix.

Social deprivation. Much research indicates a significant link between reoffending and social deprivation. Public Health England (2019)[29] makes clear that community risk factors include deprivation, poor housing, unsafe areas, and poor social mobility, while school and peer group risk factors include poor educational attainment, truancy, and low expectations from teachers. All of these factors are strongly related to social deprivation as measured by child poverty in the local YJS area.

Our chosen metric of social deprivation was the IDACI metric (Income Deprivation Affecting Children Index) from the Index of Multiple Deprivation (IMD) by local authority[30]. Our rationale for this metric, compared to the general IMD score, is that it relates more closely to a child-focussed perspective.

Where a local YJS comprises several local authorities, we have created a weighted average IDACI score using the population of children aged 10 to 17 by area.

Turning to social capital, a first point to note is that social capital has many aspects. ONS (2022)[31] for example, identifies four domains - personal relationships, social network support, civic engagement, and trust and cooperative norms, and assesses these in 28 different ways. However, ONS only reports these metrics at regional level.

Our quick review has found two social capital metrics available at disaggregate level – (a) estimates of "Social Fabric" levels compiled by the Onward think-tank; and (b) Department for Education data on the gap in the proportion of 18 year olds going on to Higher Education between those who were and were not in receipt of free school meals:

Onward's Social Fabric metric[32]

This is comprised of five 'threads': Relationships (the membership of formal groups in a community and their participation in activities with many people); physical

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[29] Public Health England (2019) '*Collaborative approaches to preventing offending and re-offending by children',* Public Health England

[30] Accessible as file 3 at https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019)

[31] ONS (2022) '*Social capital in the UK: April 2020 to March 2021'*, Office for National Statistics

[32] See Onward (2020) '*The State of our Social Fabric'*, Onward

infrastructure (the physical assets that are present in communities which facilitate, structure and organise people within a community), Civic Institutions, Economic Value (the tangible assets of individuals and families in the community) and Positive Social Norms.

Social capital as inferred from school progress data

Our rationale for consideration of this metric is that it represents a proxy for the level of social cohesion in an area. For example, the Oxford Reference site comments that 'A cohesive community is a community that has naturally many cross-links, where people from different race, age, background, feel free and happy to mix together in housing, in education, [and] in leisure facilities' (UK Housing, Planning, Local Government and the Regions Sixth Report)[33]. One of the rate sources that is available at local authority level is the gap in attainment into Higher Education level status between those who do and those who do not have Free School Meals status[34]. Where a local YJS comprises several local authorities, we have created a weighted average gap score using numbers of children aged 10 to 17 by area.

It should be noted that both the Onward Social Fabric metric and Department for Education higher education attainment gap metric are experimental in application to analyses on criminal justice, and so consequent reported results should be treated with caution.

(5) Characteristics of the youth justice system

We have examined two potential metrics for this category – trust and confidence in the local Police Force; and the gap in the ethnic backgrounds of youth justice system practitioners and the population they serve.

Police Force public confidence ratings

Our rationale for considering trust and confidence in the local Police Force is that it represents a direct measure of perceptions in policing.

We have used data from an ad-hoc publication ONS (2019)[35]. In particular, we drew on the two metrics "Overall confidence in local police" and "Police would treat you fairly". Our approach was to input the value for confidence / treat-you-fairly that related to the local YJS area of the relevant child (our database had no further identifier of geographical location beyond a record of which YJS area applied).

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[33] www.oxfordreference.com/view/10.1093/oi/authority.20110803100515609

[34] see "Free School Meals – gap" file at https://explore-education-statistics.service.gov.uk/data-catalogue/widening-participation-in-higher-education/2020-21

[35] ONS (2019) '*Crime Survey for England and Wales (CSEW) estimates of personal and household crime, anti-social behaviour, and public perceptions, by police force area, year ending March 2019*', accessible at www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/adhocs/010237crimesurveyforenglandandwalescsewestimatesofpersonalandhouseholdcrimeantisocialbehaviourandpublicperceptionsbypoliceforceareayearendingmarch2019

It should be noted that such data was only available by Police Force area rather than Local Authority area; this drawback means that localised issues are not necessarily picked up by the assessment. Also highly notable is that the ONS urge caution in usage of the data, with the caveats (a) "Please note that this table may not be suitable for all analytical purposes as it was produced in response to an ad hoc request", and (b) "Being based on small sample sizes, police force area estimates from the CSEW are less robust than national level estimates and should be treated with extreme caution".

Gap in ethnic backgrounds of local YJSs compared to population they serve

One of the key themes of the accompanying qualitative report "*Understanding ethnic disparity in reoffending rates in the youth justice system*" is that children often perceive the ethnic backgrounds of the practitioners of the youth justice system to be markedly different from them.

We have, therefore, assessed the extent to which there is a gap, for inclusion in our analysis of potential drivers of disproportional effects by ethnic background.

Our variable of difference had several steps:

- We calculate the proportion of the local population that are not of a White British background of each local authority using table A of ONS (2016)[36]

- We take statistical data on the ethnic background of managers, practitioners and administrative staff by local YJS area in June 2017, and calculate the proportion of staff who are not of a White background

- We subtract the second value from the first to assess the gap in minority ethnic background rates.

Note that more up-to-date data is available on the ethnic background of managers, practitioners and administrative staff by local YJS area, however we used earlier data because we would expect a time-lag before any reduction in the gap in minority ethnic background rates would be expected to lead to improved trust with those from an ethnic background in the relevant area.

(6) Characteristics and background of the individual

The three variables that we included in our initial model were practitioners' assessments of two factors assisting desistance, and the care status of the child in the database.

In relation to care status (which for the purposes of this study relates to formal action taken by the Children's Services department of a local authority), we have drawn

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[36] ONS (2016) '*Population Estimates by ethnic group and religion*', ONS Research Report. Data limitations on this source should be noted, as the ONS make clear that the outputs are not official statistics, but instead were produced to accompany a research paper describing a method of producing such estimates (based on the Annual Population Survey, mid-year population estimates and the 2011 Census) and seeking user feedback on usefulness.

on data showing whether an individual is recorded (at their first relevant interview) as "Never" or "Currently" or "Previously" being in care.

In relation to factors assisting desistance, we have focussed on two factors within the AssetPlus database – (i) Family, networks and relationships; and (ii) Learning and employment. These two categories were chosen as they have substantially more data points than others, and have a higher correlation with reoffending than the other factors in the AssetPlus database.

Both factors were marked as a "Strong", "Moderate", "Weak" or "Potential" effect (in reducing order of positivity - (see p17 of "AssetPlus Model Document", published by YJB in 2014). We translated these into a score of 1.0, 0.75, 0.5 and 0.25 respectively.

Data collation, anonymisation, and deletion

A selection of AssetPlus data (with code ID rather than names and no geographical identifier apart from the local YJS) was sent to Traverse offices for secure processing and analysis.

This data comprised separate files in respect of (a) case management data that contained background, demographic and risk assessments of children; (b) offence data that contained information on offence category, legal outcome and outcome date; and (c) ratings on factors for desistance.

A collated spreadsheet was created, with a single row being used to record the data for a given child.

In this spreadsheet, we removed cases where the child was aged over 17 at the time of their first offence, and cases where the first offence occurred beyond the cut-off point of March 2020. We further removed cases where there was record of a Breach occurring (since this was a sign that they had not entered the youth justice system on that occasion).

In our data checking process:

- We checked that initial YOGRS scores were within range (no negative scores or scores above 100%), and replaced 0 scores with blank fields.
- We checked 12 cases at random from the full data set to ensure (1) that those cases had been included/excluded in line with our criteria; and (2) that the data had been carried across from the various raw data files correctly

AssetPlus data was then merged with (a) YJS local staff data and (b) public data relating to the YJS area on the basis of the relevant YJS for the child.

A further process of anonymisation was then undertaken on AssetPlus data. Age at time of first offence (in years to 1 decimal place) was calculated for each child (replacing month and year birth data), and data on positive factors for desistance was deleted for all aspects apart from family and networks, and learning and employment factors data.

Logistic regression was then undertaken on the collated data in line with the approach set out in the Methodology section.

After the analysis stage was concluded, a secure copy of the fully anonymised collated dataset was provided to YJB. All data and datasets held by Traverse were then deleted.

Results of analysis

Analysis of the probability of reoffending

The logistic regression analysis found:

- A very strong link between practitioners' assigning a higher initial assessment of the risk of reoffending (YOGRS) and actual higher rates of reoffending

- A strong link between either being in care or having been in care and higher rates of reoffending

- A close link between lower levels of reoffending and positive attitudes on learning and employment, and similarly a link between less reoffending and positive perspectives on parenting, family and relationships

- A slight (though statistically significant) negative link between social capital in an area and reoffending

- A statistically significant greater likelihood for those from a Black background to reoffend (compared to those from a White background) over and above these factors

Table 5 below shows the results of the regression based on all variables showing as statistically significant (as indicated by z statistics that are either greater than 1.96 or below -1.95, and corresponding probability "P>|z|" statistics that are below 0.05)[37].

The variables shown relate to six types of influence on the expected probability of reoffending, namely:

- Constant term – the underlying likelihood
- Demographics factors - Age at first outcome, Gender (female/male), Ethnic background);
- Time effects – the length of period in which to reoffend and be identified as such in our dataset;
- Type, frequency and risk of offence - the type of first offence, whether there were convictions on more than one type of offence, and the estimated risk of reoffending (as determined by the YOGRS score);
- Type of previous disposal
- Wider social aspects – social capital, as proxied by the gap in Higher Education (HE) attainment between those with/without free school meals);
- Characteristics of the individual – whether the child is in care, or has previously been in care, attitudes to learning and employment, and perspectives on family and relationships

Table 5 Results of logistic regression model of reoffending

Reoffending variables	Coefficient	Std. err.	z	P>|z|

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[37] though not statistically significant, we also included the terms relating to those with an Asian or Chinese background and Other ethnicity given this study's focus on disparate outcomes for those from different ethnic backgrounds

Constant term				
Constant	0.46	0.60	0.76	0.45
Demographics				
Age at 1st outcome	-0.25	0.03	-7.24	-
Female	0.12	0.12	1.01	0.31
Ethnicity Asian/Chinese	-0.33	0.17	-1.88	0.06
Ethnicity Black	0.30	0.11	2.72	0.01
Ethnicity Mixed	0.25	0.12	2.12	0.03
Ethnicity Other	0.08	0.27	0.29	0.77
Time effects				
Time (years) to end period	0.31	0.06	4.93	-
Type of previous disposal				
Custody	-0.66	0.19	-3.45	0.00
Type / frequency / risk of crime				
Drugs	0.32	0.16	1.93	0.05
Fraud and forgery	1.10	0.56	1.98	0.05
Public order	0.35	0.16	2.22	0.03
Sexual offences	-1.30	0.30	-4.37	-
Theft	0.50	0.15	3.24	0.00
Multiple types of crime	0.16	0.08	2.11	0.04
YOGRS	3.85	0.27	14.27	-
ROSH judgement index	1.72	0.17	9.92	-
Personal characteristics				
Currently in care	0.69	0.10	6.96	-
Previously in care	0.27	0.08	3.33	0.00
Family perspective	-0.63	0.16	-3.96	-
Learning attitudes	-0.49	0.14	-3.6	-
Wider effects				
Population density (*1000)	0.020	0.010	2.00	0.05

(Number of obs = 4,223. Pseudo R2 = 0.166)

The overall ability of the model to predict outcomes is relatively weak (as shown by the pseudo R2 statistic of 0.17), and with 4,223 observations only covers around 30% of the children in the data-set due to data gaps (since $4,223 \div 14,488 = 0.293$), but it does nonetheless highlight a variety of potentially important relationships. In particular, the model identifies two ethnic minority backgrounds – Black and Mixed - with a statistically significant coefficient in relation to reoffending.

As stated in the Methodology section, we now translate the coefficients for these two groups by calculating the Odds Ratios relative to those from a White Background, and then combining this with data on the baseline probability of reoffending to determine Relative Risk (as per Grant 2014[38]).

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[38] Grant, R. (2014) 'Converting an odds ratio to a range of plausible relative risks for better communication of research findings', *BMJ* 348:f7450 (doi.org/10.1136/bmj.f7450)

Table 6 below shows coefficient, odds ratio and relative risk for a baseline probability (calculated for a child with a White background) of 36.7%.

Table 6 Assessing relative risk Results of logistic regression model of reoffending

Key outcome	Coefficient	Odds ratio	Base probability	Relative risk ratio
Ethnicity Asian/Chinese	-0.33	0.72	36.7%	80%
Ethnicity Black	0.30	1.35	36.7%	120%
Ethnicity Mixed	0.25	1.29	36.7%	116%
Ethnicity White	n/a	1.00	36.7%	100%

The above results imply that there is around a one-fifth additional risk of reoffending for a child from a Black background compared to a child from a White background after contextual factors (such as YOGRS and attitudes to learning and employment) have been taken into account. Risks are similar, though slightly lower, for those from a Mixed background. For a baseline reoffending rate of 36.7% for children from a White background, this implies a reoffending rate of the order of 44% for those from a Black background, and 43% for those from a Mixed background.

This is a disquieting result - even though it seems very likely that this gap has significantly reduced since the period of the cohort (2018 to 2020 for first offence), as shown by YJB (2023)[39]. It is, though, in line with the picture in the accompanying Traverse study "*Understanding ethnic disparity in reoffending rates in the youth justice system: Child and practitioner perspectives*", which reports perceived 'over-policing', school exclusion, overlooked and misunderstood needs among education and youth services, and low expectations among probation staff to be perceived as especially prominent features for those with a Black background.

That said, it is important to draw on the whole of the evidence reflecting on this topic, and there is a strong case for the view other factors that are not well covered by YJB assessment processes (such as mental health) should not be overlooked as potential drivers of these relative risks in future research.

Analysis of the probability of custody given reoffending

The logistic regression analysis found:

- The greater practitioners' initial assessments of the risk of reoffending, or of the risk of serious harm, the greater the likelihood of implementation of a custodial sentence

- Previous imposition of custody or community sentence at first offence makes it significantly more likely there will be a sentence of custody on reoffending

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[39] Figure 9.5 of YJB (2023) '*Youth Justice Statistics 2021/22*', Youth Justice Board of England and Wales shows a halving of the gap in (unadjusted) re-offending rates between ethnic minority groups and those with a White background over the period 2018 to 2021.

- A significantly greater likelihood for a child from an Asian/Chinese, Black, or Mixed background to receive a custodial sentence, over and above these two factors

Table 7 below shows the results of the preferred model, again based on all variables showing as statistically significant (with z statistics greater than 1.96 or below -1.95, and probability "P>|z|" statistics that are below 0.05), plus the 'Other' ethnicity.

The variables shown relate to five types of influence on the expected probability of reoffending, namely:

- Constant term – the underlying likelihood
- Demographics factors - Age at first outcome, Gender (female/male), Ethnic background);
- Time effects – over a longer length of reoffending behaviour, the prospect of a custodial sentence being imposed increases;
- Type, frequency and risk of offence - the estimated risk of reoffending as determined by the YOGRS score and the ROSH judgement);
- Previous disposal type

Table 7 Results of logistic regression model of custody after reoffending

Custody after reoffending	Coefficient	Std. error	z	P>|z|
Constant term				
Constant	-4.71	0.30	-15.88	0
Demographics				
Ethnicity Asian/Chinese	0.53	0.20	2.69	0.007
Ethnicity Black	0.52	0.10	4.99	0
Ethnicity Mixed	0.38	0.13	2.99	0.003
Ethnicity Other	0.33	0.30	1.09	0.278
Female	-0.86	0.21	-4.07	0
Time effects				
Time (years) to end period	0.43	0.08	5.27	0
Frequency and Risk				
Multiple types of crime	0.19	0.08	2.22	0.027
YOGRS	1.10	0.29	3.83	0
ROSH judgement index	1.57	0.18	8.56	0
Type of initial disposal				
Initial disposal – community	0.60	0.10	6.22	0
Initial disposal – custody	1.94	0.17	11.72	0

(Number of obs = 4,854. Pseudo R2 = 0.137)

The overall ability of the model to predict outcomes is relatively weak (as shown by the pseudo R2 statistic of 0.14), though with 4,854 observations it has a high coverage (almost 90%) of the relevant cohort (since 4,854 ÷ 5,529 = 0.878).

Nonetheless it matches with expectations as to key relationships:

- The greater practitioners' initial assessments of the risk of reoffending, or of the risk of serious harm, the greater the likelihood of implementation of a custodial sentence
- Previous imposition of custody or community sentence at first offence makes it significantly more likely there will be a sentence of custody on reoffending
- A significantly greater likelihood for a child from an Asian/Chinese, Black, or Mixed background to receive a custodial sentence, over and above these two factors

That said, the above model is much more streamlined than the assessment in relation to factors driving reoffending, and so it is striking that features such as children's attitudes to family and employment, or care status, do not influence custodial decisions in a statistically significant way.

We next turn to the question of what the above coefficients imply for the relative risk of a custodial sentence for those from an ethnic minority background. We use the same approach as that deployed in relation to assessments for the probability of reoffending. Table 8 below shows coefficient, odds ratio and relative risk for a baseline probability (calculated for a child who has reoffended with a White background, male and does not have multiple types of crime) of 14%.

Table 8 below shows baseline probability, odds ratio and relative risk of custody by ethnic background.

Table 8 Risk ratios for custodial sentence

Key outcome	Coefficient	Odds ratio	Base probability	Risk ratio
Ethnicity Asian/Chinese	0.53	1.70	14%	155%
Ethnicity Black	0.52	1.68	14%	154%
Ethnicity Mixed	0.38	1.46	14%	137%
Ethnicity White	n/a	1.00	14%	100%

These results imply a far greater likelihood for a child from an Asian/Chinese, Black or Mixed background to receive a custodial sentence, even once contextual factors have been taken into account. Compared to a custody rate of 14% for those from a White background, our analysis of relative propensity suggests custody rates of 21% for those from an Asian/Chinese or Black ethnicity, and 18% for those from a Mixed background.

It is also worth noting that any bias in relation to the type of disposal at first offence has further consequences, since our model shows a strong link between type of first disposal and future use of custodial sentencing. Given that ZK Analytics and YJB (2021)[40] shows ethnic minorities receive disproportionately harsher disposals, it is

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[40] ZK Analytics and YJB (2021) '*Ethnic disproportionality in remand and sentencing in the youth justice system*', Youth Justice Board of England and Wales

highly likely that the disproportionality in sentencing received by ethnic minorities is higher than the risk ratios shown above.

Discussion and recommendations

Discussion

The accompanying Traverse qualitative report "*Understanding ethnic disparity in reoffending rates in the youth justice system*" found many signs of a perceived marginalisation of individuals and communities.

The focus of this study was to deploy quantitative analysis to complement those insights. We have examined whether there are indications of unwarranted disparities in outcomes for different ethnic groups for those that reoffend.

Prediction of reoffending behaviour and choices on imposition of custody after reoffending is far from straight-forward, as indicated by the relatively low pseudo-R-squared statistics in our models. Nevertheless, it is possible to determine factors that, across the sample as a whole, do make a difference to outcomes. Our analysis suggests substantial, statistically significant differences in reoffending rates among different ethnic groups. We observe a higher-than-expected reoffending rate for children with a Black or Mixed background, even after various contextual factors are taken into account.

The reasons for such a differential are complex. Nonetheless, evidence suggests there may be a "vicious cycle" of over-policing and under-protection for children with a Black or Mixed ethnic background who offend, which in turn may be a factor affecting reoffending, which in turn may facilitate reactions of over-policing and under-protection.

Such effects may well be exacerbated by Joint Enterprise cases[41] (an effect we were not able to quantify due to data gaps). Continued efforts to address 'over-policing', school exclusion, and overlooked and misunderstood needs should be maintained and increased.

The strong relationship between care status and reoffending also highlights the importance of particular focus on the needs of children who are or have been looked after when considering ways to address reoffending.

More positively, we also observe a lower-than-expected reoffending rate among those with an Asian / Chinese background, and further research on this group may present potentially useful policy lessons.

Also on a positive note, constructive attitudes towards learning and employment appear to play a very useful role in reducing reoffending. This reinforces the need to continue to promote and facilitate education and career aspirations.

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[41] Jacobson, J. et al (2016) '*Joint enterprise: Righting a wrong turn?*', Prison Reform Trust, cites (page iii) strong criticism by a wide variety of groups in relation to "many cases" in which it is argued that "the level of participation in the offence was so slight, or the evidential threshold of conviction so low, that the conviction amounts to a substantial injustice"

Turning to decisions in relation to custody for those children that reoffend, we observe a much greater propensity for this disposal among ethnic groups compared to those with a White background – even after all contextual factors are taken into account. This indicates signs of systematic disparity.

Recommendations

Improvements in data would enable better understanding of factors influencing ethnic disproportionality and facilitate better monitoring of changes over time. We recommend that action be undertaken to:

- Facilitate linking to Data First. This would be useful in identifying the type of Court and the gravity of offences committed by children. We also believe it is important to obtain a way to assess which children have been assessed as having committed an offence on the basis of joint enterprise charges;

- Improve the proportion of AssetPlus assessments completed and the quality of the data input into AssetPlus - we understand that new data systems are being developed for AssetPlus, which will potentially enhance the usability and reliability of future analysis;

- Improve data collection as to diversity of staff among police and the judiciary, and assessing the impact of such diversity – this will facilitate further research into factors influencing adverse disparity in outcomes among those with different backgrounds;

- Explore improvements in data collection on mental health, and assessing the impact of mental health on outcomes in more detail.

Turning to potential data analytics, we recommend consideration of analysis of differences in reoffending rates and custody rates:

- By region and/or local justice service area,
- By circumstances of interest (for example, by type of crime)
- Over time, since by comparing patterns between 2018/19 – 2019/20 and 2021/22, there may be lessons to learn as to how the substantial improvements in disparity in reoffending rates can be sustained.

Lastly, we have noted adverse disparities among ethnic groups in relation to outcomes for custody on reoffending. Continued efforts to reduce adverse disparity should be undertaken, possibly supported by the introduction of benchmark information and enhanced training, for those making and influencing the decisions.

Appendix 1- Diagnostics

Review of residuals

In relation to the analysis of the probability of custody after reoffending, a useful approach is to examine the differences for each case between the actual occurrence and the predicted probabilities - the "residuals" - and assess whether those differences are particularly striking when taking into account the level of variability in the data.

This process is known as calculating the "standardized Pearson residuals", and we have assessed these for each case (1) in relation to our model of reoffending, and (2) in relation to our model of the probability of receiving a custodial sentence.

Using this approach, we have found 18 cases with a standardized Pearson residual greater than 3 for the model in relation to reoffending; and 28 cases with a standardized Pearson residual greater than 4 for the model in relation to custody after reoffending (these figures indicate that further investigation of other variables not included in the model may be particularly useful in the model on use of custody after offending).

A comparison of coefficients in relation to the reoffending and custody after reoffending models is shown in Table A1 below.

Table A1 Comparison of coefficients by ethnic group with and without outliers

	Coefficient in original model	Coefficient in model excluding outliers	% change in coefficients
Model of reoffending			
Ethnicity Asian/Chinese	-0.328	-0.308	-6.0%
Ethnicity Black	0.301	0.320	6.3%
Ethnicity Mixed	0.251	0.269	7.1%
Ethnicity Other	0.078	0.111	41.7%
Model of custody			
Ethnicity Asian/Chinese	0.528	0.612	15.9%
Ethnicity Black	0.522	0.576	10.5%
Ethnicity Mixed	0.375	0.448	19.3%
Ethnicity Other	0.330	0.315	-4.4%

The changes suggest that the inclusion/exclusion of outliers does have some effect, particularly in relation to the modelling of custody, but the overall scale of impacts is not substantially altered. In general, the more cautious estimates of values occur with the original model (an exception is Other ethnicity in the reoffending model, but it is not statistically significant and not reported in table 6), and so we have retained the original model in both instances. That said, the amount of outliers is not ideal, and so the theme of this report would benefit from additional exploration in future.

Review of multi-collinearity

A standard test of multi-collinearity known as VIF shows signs of multi-collinearity.

A value of 1 indicates there is no correlation between a given predictor variable and any other predictor variables in the model. A value between 1 and 5 indicates moderate correlation between a given predictor variable and other predictor variables in the model. A value greater than 5 indicates potentially severe correlation, making the coefficient estimates and p-values in the regression output unreliable[42].

As no variables approach a value of 5 on their VIF statistic, our models pass this test.

Test for multi-collinearity – reoffending model

Variable	VIF		VIF
Reoffend	1.26	Public order	1.05
Age at 1st outcome	1.08	Sexual offences	1.09
Female	1.35	Theft	1.07
Ethnicity – Asian/Chinese	1.10	Multiple_types	1.08
Ethnicity - Black	1.33	Currently_care	1.21
Ethnicity - Mixed	1.10	Previously_care	1.22
Ethnicity- Other	1.03	YOGRS	1.57
Time (years 1st) outcome to end	1.07	Family - For	1.18
Initial_Disposal_Custody	1.09	Learning - For	1.17
Drugs	1.07	Population density	1.31
Fraud and forgery	1.02	ROSH_judgement_index	1.23

Test for multi-collinearity – Custody after reoffending model

Variable	VIF
Reoffend_Custody	1.16
Ethnicity – Asian/Chinese	1.02
Ethnicity - Black	1.1
Ethnicity - Mixed	1.05
Ethnicity - Other	1.01
Female	1.18
Time (years) 1st outcome to end	1.11
Initial_disposal_Community	1.18
Initial_Disposal_Custody	1.16
Multiple_types of crime	1.03
YOGRS	1.35
ROSH_judgement_index	1.13

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[42] (https://www.statology.org/multicollinearity-regression/)

Glossary

AssetPlus - an assessment and planning interventions framework used by YJSs in which one record is used to follow a child or young person throughout their time in the youth justice system

Care status – whether or not a child or young person is or has been taken into care by the relevant local authority.

Coefficient – part of the outputs of a logistic regression, the coefficient on a given explanatory variable takes the meaning that for every unit increase in that variable, the expectation is that the dependent variable will change by the amount of that coefficient.

Cohort – a group of subjects who share a defining characteristic, such as a given age range or level of educational qualification

Confidence interval – this interval (a range of values from a given level above a sample mean to a given level below the sample mean) has the property, broadly speaking, of having a chosen probability (often 95% or 99% - we use 95% in this study) that the true population mean falls within that interval

Disposal history – the previous disposals (first tier, custody etc) that were given to a given to a child who has reoffended

Explanatory variable – a variable chosen on the basis that it has some form of explanatory or predictive power in estimating values for the chosen variable of interest (the "dependent variable")

IDACI – an acronym for Income Deprivation Affecting Children, it is a measure of social deprivation that is part of the Index of Multiple Deprivation (IMD), and is particularly focussed on child poverty

Multi-collinearity – the occurrence of high intercorrelations among two or more explanatory variables in a regression model, which can lead to flawed and incorrect results being reported.

ONS - Office of National Statistics

Outlier – an extreme value (for either a dependent or explanatory variable) that stands out greatly from the overall pattern of values in a given data set.

P-value (in relation to P > z) – part of the outputs of a logistic regression, the p-value indicates whether a coefficient for a variable is statistically significant or not. If the p-value is below 0.05 (5%), this means that the coefficient is statistically significant at the 5% level.

pseudo-R^2 – (pseudo R-squared) is a statistical measure that reviews the proportion of variability in the dependent variable that can be explained by the explanatory variables. It should be noted that there is no accepted standard version for calculation, and so the statistic should be interpreted with caution

Logistic regression - a statistic technique used to predict the value of the "dependent variable", based on the value of one or more "explanatory variables", when the dependent variable represents the probability of an occurrence (and so takes a value between 0 and 1).

Reoffending rate – the proportion of children in a given cohort who reoffend

Relative risk ratio – this refers to the probability of an event occurring in a given group of interest compared to the probability of an event occurring in a comparator group. Relative Risk is calculated as the ratio of the probabilities of the two groups, and a relative risk above 1 implies that the event is more likely to occur in the given group of interest than the comparator group.

Residual – part of the outputs of a logistic regression, this represents the difference (for a given instance of a dependent variable) between the actual and expected value (calculated on the basis of the coefficients placed on the explanatory variables and the values of the explanatory variables for the given case).

ROSHA – A ROSHA (Risk of Serious Harm Assessment) is an assessment completed by the YJS to see if according to their questions a person is a serious harm risk to members of the public. The results, including an overall index of the Risk of Serious Harm (ROSH), is used in consideration of the type and severity of disposals that the young person should receive.

Standard error – the standard error of an explanatory variable in a logistic regression is a way to measure the "uncertainty" in the estimate of the coefficient for that variable in that regression.

Standardized Pearson residual – in linear and logistic regression, these residuals provide a measure of how well the observation is predicted by the model, taking into account the variability of the explanatory variables. Observations that are not fit well by the model have high Pearson residuals.

YJS - Youth justices service

z-statistic - part of the outputs of a logistic regression, this is calculated as the ratio of the coefficient and the standard error of that coefficient. A z-statistic is then compared against threshold levels of statistical significance to determine whether a variable is statistically significant or not.