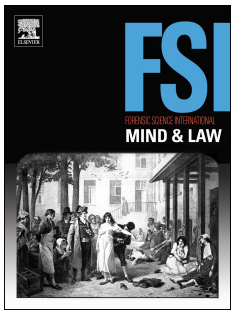


# School to prison pipelines: Associations between school exclusion, neurodisability and age of first conviction in male prisoners

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# School to Prison Pipelines: Associations Between School Exclusion, Neurodisability and Age of First Conviction in Male Prisoners

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***Keywords:*** *School Exclusion, Youth Justice, Neurodisability, Life Course Theory, Pupil Referral Unit, School Discipline.*



## Author Note

*Conflicts of Interest:* Amanda Kirby is CEO and Founder of Do-IT Solutions. Do-IT Solutions developed the Do-IT profiler. Do-IT Solutions anticipate no direct or indirect financial gain from the publication of these findings. The other authors have no conflicts of interest to declare.

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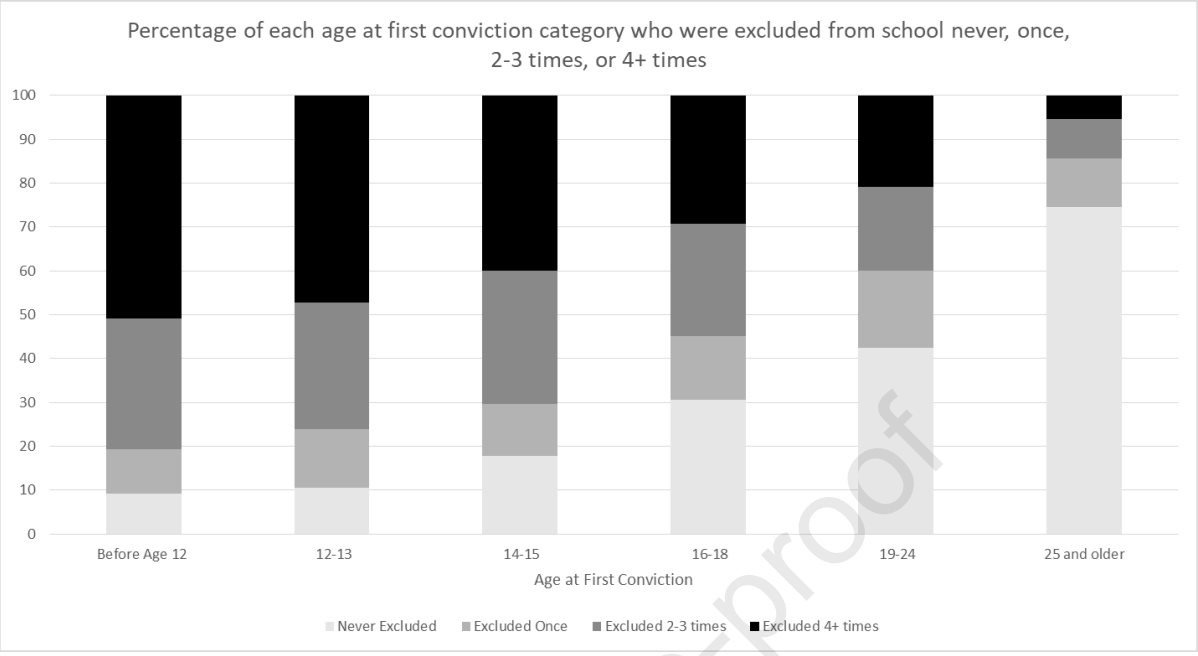
# Graphical Abstract



# School to Prison Pipelines: Associations Between School Exclusion, Neurodisability and Age of First Conviction in Male Prisoners

**Abstract**

Both school exclusion and neurodisability are prospective markers for increased risk of subsequent contact with criminal justice system in general and justice-involved samples. However, relationships between school exclusion, neurodisability, and age at first conviction have received minimal attention. Age at first conviction is an important outcome, as justice system contact is criminogenic, so people convicted at a younger age are at risk of becoming entrenched in the system. This issue was addressed with data collected from 3035 convicted male adults, who completed the Do-IT Profiler screening assessment in HMP Parc (Wales, UK). Multiple school exclusions were associated with earlier first convictions, with those excluded once, 2-3 times, and 4 or more times being first convicted 3, 5, and 6 years earlier on average than the never-excluded cohort. Of the excluded cohort, 45% were sent to a Pupil Referral Unit (PRU) (a facility for children excluded from mainstream school). They were first convicted an average of 2 years younger than those who were excluded but never sent to a PRU, and an average of 6 years younger than those who were never excluded. This suggests that being sent to a PRU is associated with earlier first convictions than exclusion alone. Each standard deviation increase in neurodisability (indexed by lower scores on a functional skills screener, used here as a proxy for neurodisability) was associated with being 0.5 years younger at first conviction. Finally, school exclusion was correlated with scores on the functional skills screener, suggesting that school exclusion could be a potential mechanism for the criminalisation of children with neurodisability. These findings elucidate associations between school exclusion (including PRU referral), poor functional skills indicative of neurodisability, and criminalisation at a younger age in prison populations.

## 1. Introduction

The rate of fixed term and permanent school exclusions in the UK has been rising since 2012/13 (Timpson, 2019). In 2021/22 the rate of permanent exclusions in the UK was 0.1%, and the rate of fixed term exclusions (which are typically five school days, but can be up to 45 school days) was 6.91% (DfE, 2023). Similar up-to-date statistics are difficult to obtain from other jurisdictions, but this pattern appears to be mirrored across Australia, and several European countries (Aursand & Rutkowski, 2021). School exclusion is associated with a myriad of negative psychosocial outcomes, including poorer mental health, unemployment, and homelessness (Pirrie et al., 2011). A critical long-term outcome associated with school exclusion is contact with the criminal justice system (Sikba et al., 2014). This has been termed a 'school to prison pipeline' reflecting the common belief that exclusion plays a causal role in exacerbating risk of criminalisation (Crawley & Hirschfield, 2018). A 2016 Ministry of Justice report found that 42% of people in prison had been permanently excluded from school at some point (MoJ, 2016). Several longitudinal studies in nationally representative samples have found support for a link between retrospective reports of exclusionary school discipline and increased risk of subsequent imprisonment (Hemez et al., 2020; Cuellar & Markowitz, 2015; Monahan et al., 2014). In addition, Mowen and Brent (2016) conducted a longitudinal study in a nationally representative sample which found both an association between school exclusion and subsequent arrest and a cumulative effect of exclusions on arrest – for each year a child was excluded, they were 157% more likely to report an arrest. This effect was robust even when controlling for levels of self-reported delinquency, supporting the hypothesis that exclusion has a unique effect on criminalisation.

Children who are permanently excluded from mainstream school are educated in 'Alternative Provision' settings in the UK, or 'Alternative Education' in the USA and other jurisdictions. Children with many fixed-term exclusions may also be educated in Alternative Provision, as may children who can't attend mainstream school for medical reasons. Alternative provision takes many forms, but for children excluded from school this is most frequently a Pupil Referral Unit (PRU). Referrals to PRUs can be fixed term or permanent, and full or part-time. Children in PRUs have poor reported outcomes in terms of educational attainment, later employment, and justice system contact (DfE, 2018a). In 2016/17, only

57% of English children in alternative provision achieved any passes at GCSE (national examinations taken at age 16 in the UK) or equivalent, in contrast to 99% of those in state-funded mainstream schools (DfE, 2018b). Referral to a PRU reflects a more severe form of exclusion, as rather than spend short periods of time at home, or in a different classroom setting, children are deemed in need of longer-term support in a controlled environment. Whilst there is evidence that, with additional support, prompt re-integration into mainstream school could be beneficial (Evans, 2010) mainstream schools are often reluctant to accept pupils back from PRUs, due to reputations and past behaviour (Atkinson et al., 2004). Pupils therefore often have long periods of attendance in PRUs (Atkinson et al., 2004). Concerns have been raised about PRUs being more like 'holding units' than educational settings, where there is a melting pot of children with vulnerability to justice system contact (Goodall, 2005). The criminogenic effect of PRU referral as a more severe form of exclusion therefore needs to be tested above exclusion alone.

***Neurodisability and School Exclusion.*** Children with special educational needs (SEN) are excluded from school at a disproportionate rate. In 2016/17, children with an identified SEN represented 46.7% of all permanent exclusions and 44.9% of fixed term exclusions, despite representing only 14.4% of the school population (Timpson, 2019; DfE, 2017) There is additionally evidence of the over-representation of children with disabilities in school exclusions in other jurisdictions including Australia (Done et al., 2021). 77% of children in PRUs have an identified SEN (DfE, 2018a). The umbrella term of "SEN" includes various types of neurodisability[1]. Neurodisability is a term for a collection of congenital and acquired neurodevelopmental conditions. Other variably used terms to describe this grouping include neurodiverse conditions, and more recently neurodivergent conditions. Neurodisabilities may include (but are not limited to) Attention-Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), Developmental Co-Ordination Disorder (DCD), Developmental Language Disorder (DLD), Dyslexia, and Traumatic Brain Injury (TBI) (Patel et al., 2011). A complex mix of factors lead to neurodisability, including genetics, birth

[1] A note on terminology; the term neurodisability is often used interchangeably with the term neurodiversity when discussing those with neurodevelopmental conditions. Neurodiversity refers to the normal variation in functional profiles of humans and advocates those differences don't need to be seen as problematic. Here the term neurodisability is favoured, as it elicits the social model of disability - recognising societal norms, practices and discrimination as the root cause of the disabling experiences of those with neurodevelopmental difficulties, including those experiences that increase risk of criminalisation.

trauma, pre-natal substance use, infection, injury, and nutritional deprivation (Patel et al., 2011). Whilst the resultant presentation is heterogeneous, neurodisabilities frequently result in functional problems in key developmental domains: cognition, memory, social and communication skills, attention and concentration, literacy, numeracy, emotional regulation, impulse control, and physical motor skills. Neurodisabilities are also frequently comorbid, and an individual may have difficulties across multiple domains that don't necessarily reach the clinical threshold for any one condition, resulting in no diagnosis (Dewey, 2018). This is particularly problematic in prisons, where diagnostic thresholds may act as gateways to pathways for intervention and support, and where individuals frequently have been missed for diagnosis earlier in life (as discussed by Kirby, 2016). Transdiagnostic models of functional ability across domains frequently impacted by neurodisability are therefore more applicable in these settings (see Astle et al., 2022 for a discussion of transdiagnostic frameworks of neurodisability). Identifying functional strengths and weaknesses of individuals (e.g. that an individual may have difficulty with problem solving) is far more relevant to prison staff in educational settings than medical diagnoses (as discussed by Fletcher-Watson, 2022).

There is evidence that SEN are underdiagnosed among children who are excluded from school (Timpson, 2019). There is a real risk of 'behaviour problems' being seen as the diagnosis and the reasons underlying behaviour remaining unconsidered. Children who are seen as having Behavioural, Emotional and Social Difficulties (BESD), or the categorisation that replaced this in 2014 – Social, Emotional and Mental Health (SEMH), are at particular risk of permanent exclusion (Timpson, 2019). However, the challenge is that these children, and particularly those with SEMH but without a Statement or Education Health and Care Plan, may not have been screened for one or more neurodisabilities despite there being evidence of higher rates of Developmental Language Disorder, Dyslexia and ADHD for example (Regan, 2010; Clegg et al., 2009).

***Neurodisability and the Criminal Justice System.*** Children with neurodisability are overrepresented in youth justice systems (Hughes et al., 2012; Mohr-Jensen & Steinhausen, 2016). For example, estimates of prevalence of ASD amongst young people in the general population are approximately 0.6 - 1.2% (Baird et al., 2006), whereas in the secure estate prevalence is estimated to be 15% (Anckarsater et al., 2007). For further examples, see

Hughes et al., 2012. Under-identification of neurodisability in courts has been linked to harsher sentencing (Baldry et al., 2018). A study by Nagale and colleagues (2019) identified that approximately 145,000 children are living with social and behavioural disability as a result of moderate-severe traumatic brain injury (TBI) in the USA, but that only 26,371 students receive special educational support for TBI. No comparable study has taken place in the UK to our knowledge. Nagale's study is indicative of a population of children in education with functional problems and behavioural sequalae because of TBI, without proper recognition and tailored support - increasing risk of poorer educational outcomes and subsequent justice system contact. This was illustrated by Clasby and colleagues (2020) who found that TBI sequalae mediated the relationship between school attainment and more frequent convictions.

In addition to being over-represented in youth justice systems, there is also evidence that children with neurodisability are likely to be convicted at a younger age. Moffit (1993) theorised that during adolescence, children's neuropsychological profiles interact cumulatively with being exposed to a criminogenic environment, increasing propensity to criminal behaviour. This has been evidenced in children who are in contact with both child welfare and child justice systems, who are more likely to have a conviction at a younger age if they also have a recognised neurodisability (Baidawi & Piquero, 2021). Other studies have found longitudinal evidence of earlier offending for children with ADHD (Retz et al., 2021), and Traumatic Brain Injury (Williams et al., 2018) for example.

***Age of First Conviction.*** Age of first conviction is an important outcome for multiple reasons. Justice system contact is criminogenic – it is the biggest predictor of future justice system contact (McAra & McVie, 2010). Contact with the criminal justice system at a young age compounds existing social problems, and severs existing peer and family support networks (Muncie, 2014). Youth offending estates are harmful psychological environments for children, with high rates of bullying, racism, violence, and self-harm reported (Gavin, 2014). Whilst arrest is associated with future offending behaviour for children of all ages, younger children are the most susceptible. Natsuaki and colleagues (2008) found that individuals who were first arrested earlier had a steeper cumulative growth in offending behaviour over time. In concordance with this, Wiley (2015) studied children in 7$^{th}$, 8$^{th}$, and 9$^{th}$ grade and found that the criminogenic effects of arrest, whilst harmful at all ages, were

less severe for older children. Individuals who commit their first offences during childhood are more 2-3 times more likely to become chronic offenders (Moffit et al., 2002), and are at risk of committing more violent crimes (Loeber et al., 2003). The United Nations Committee on the Rights of the Child (2019) are clear that detention of children should only be used as a last resort and should be for the shortest possible period, so reductions in younger convictions are a clear target for justice systems. Thus, risk factors that promote earlier age of first conviction are particularly concerning because they may worsen long term outcomes by exposing individuals to criminogenic factors during sensitive developmental periods.

**1.1 Theoretical Framework.** In line with much of the current literature, we attribute the impact of school exclusion on later arrest to Life Course Theory. Work that situates the school to prison pipeline as part of life course theory discusses school exclusion as a 'turning point' - a catalyst for change which affects future life outcomes (Mowen & Brent, 2016). These 'turning points' can build and become cumulative - for example the negative impact of school exclusion could be exacerbated by the additional 'turning point' of referral to a PRU (Sampson & Laub, 1997). School exclusion can create stigmatising labels of delinquency, and self-identification as deviant from societal norms, perpetuating future offending behaviour (Brent & Mowen, 2016; Liberman et al., 2014). The thread of neurodisability within this research is situated within the theoretical framework of the social model of disability (Oliver, 1983; Oliver, 1990). Individual or medical models of disability place the locus of the problem within the person with a disability - for example, a child with ADHD is struggling to engage with a school class due to lack of focus and impulsive behaviours. Whereas social models of disability locate the problem within the school system the disabled child is navigating, which are frequently inaccessible and inappropriate. For example, the child with ADHD is not being engaged by a school class due to a requirement to sit still for long periods of time with no breaks. The social model also highlights how systemic failings to deliver appropriate and accessible education results in the systemic discrimination of children with neurodisability as a group, rather than discrimination solely against individuals (Oliver, 1990). In the context of this research, we posit that the failure to provide accessible and appropriate school services for all children with neurodisabilities results in school exclusion, and in line with Life Course Theory this perpetuates contact with the criminal justice system at an earlier age, and the associated outcomes of this earlier

justice system contact as previously discussed. The net effect of this is the criminalisation of children with neurodisability.

**1.2 The Current Study.** The aims of this study were firstly to establish whether there is a relationship between school exclusion and age at first conviction, by testing whether number of school exclusions is associated with being younger at first conviction. Within this question, we tested whether spending time in a PRU was associated with earlier first convictions than exclusion alone. Secondly, we aimed to test whether neurodisability was associated with age at first conviction. Thirdly we aimed to test whether neurodisability was correlated with school exclusion, to explore a potential explanatory mechanism which could be pursued in future research. Here, we posit that neurodisability temporally precedes school exclusion as causes of neurodisability are frequently congenital or acquired in early life (with the possible exception of TBI or neurodisability from infection).

A fundamental limitation of this research (and much research in this field) is unobserved confounding. Any negative association between school exclusion, neurodisability, and age at first conviction may actually reflect variables not captured in this administrative dataset, such as socio-economic status, or whether any individual had experienced a Traumatic Brain Injury. We therefore present our findings as correlational, rather than inferring causality.

## 2. Method

**2.1 Data.** Data were collected from entrants to HMP Parc (an all-male institution in Wales, UK) in 2016-2018. Entrants to HMP/YOI Parc were screened using the Do-IT profiler as part of routine procedure during the first 6 weeks of prison. 3544 individuals were screened. 413 were removed from the analysis as they were being held on remand and had not been convicted. 96 were excluded for having missing data in one or multiple variables. The final sample therefore comprised 3035 individuals. The sample description can be found in table 1.

**2.2 Measures.** The Do-IT profiler is a holistic computerised screening tool, organised into modules. It has built in accessibility functions, such as the option to have questions and answers read aloud, and the ability to change the text and background colour. A staff member was present during completion, to assist if required.

Modules completed included 'About Me' - collecting demographic information and information on the individual's life before prison, and the 'Knowledge and Skills Screener (KASS)' which tests for functional skills. Other modules are also available to staff, these were beyond the scope of this analysis so are not described here. Upon completion, recommendations are automatically made to prisoners and staff for strategies to assist with any identified functional difficulties.

***About Me (Demographics) Module.*** This module comprises a series of self-report questions about gender, ethnicity, current status (convicted or remand), school exclusions, attending a PRU, and age of first conviction, as well as other variables which are routinely collected but are beyond the scope of this analysis. Example questions include 'Have you ever been excluded from school?' and if yes, 'How many times have you been excluded from school?' and 'Have you ever spent time in a Pupil Referral Unit (PRU)?'. No data were collected on type of exclusion (permanent or fixed term), or on age at exclusion. The sample was majority White British, and other ethnic groups were captured inconsistently. Therefore we created a binary variable to capture being White British or other, in order to control for ethnicity in our analysis.

***Knowledge & Skills Screener (KASS) Module.*** KASS is a 42 question screening tool which assesses functional skills relevant to everyday life. It captures basic skills in literacy, cognition, problem solving, executive function, and numeracy, however, is not split into distinct domains. The KASS is used here as a proxy for neurodisability. This rejects medical diagnostic models of neurodisability with threshold scores for diagnosis, and instead employs a continuous scale of functional ability to capture relevant strengths and weaknesses. Example questions include 'What time is the clock showing?' accompanied by a picture of an analogue clock, and 'How much does this add up to?' accompanied by a picture of a variety of coins. Multiple choice responses are displayed on the screen, and responses are scored 1 if correct and 0 if incorrect. The maximum score is therefore 42.

The KASS screener was developed in collaboration with prison staff (Kirby & Saunders, 2015; Kirby, 2016) in HMP & YOI Parc, with the specific intention of helping staff to identify and respond to the high level of neurodisability in prison populations. It is designed to support staff with identifying functional areas individuals may need support with to help them to engage in education and rehabilitation programmes within the prison.

As the KASS is a functional skills measure, those who are scoring more poorly are likely struggling with skills which are key to success in traditional classrooms. Additionally, struggling with functional skills such as telling the time or reading a bus timetable could impair an individual's ability to engage in rehabilitation (for example, ability to attend probation appointments). Normative data is not available for general population samples, which is a limitation of the measure.

**2.3 Ethics.** Ethical approval for this study was granted by the University of Exeter Department of Psychology Research Ethics Committee, and by the HMPPS National Research committee (NRC). Permission to analyse the routinely collected anonymised data was granted by HMP Parc as data controllers. Consent was provided by participants at the point of screening for Do-IT to use anonymised data for research, and this is a routine part of the screening process.

**2.4 Analysis.** All analyses were conducted using R Version 3.6.1 (R Core Team, 2017). Four models were fitted to test our research questions. All models had self-reported age of first conviction as the outcome, and all controlled for current age, being White British, and z-scores on the KASS. Z-scores were preferred to the raw scores for the KASS measure to assist with interpretation. Controlling for current age was important in this adult sample due to changes in school exclusion rates over time (Timpson, 2019) and changes in numbers of youth arrests over time (Howard League for Penal Reform, 2020). Due to the outcome variable (Age of First Conviction) being only available as coarse age bands (as described in table 1), we used interval regression rather than conventional linear regression models (Long, 1997). The interpretation of the regression coefficients are then the same as if exact age of first conviction had been observed.

Firstly, a model with age of first conviction as the dependent variable and number of school exclusions as the independent variable was fitted. Number of school exclusions was a categorical variable with four levels - never excluded, excluded once, excluded 2 or 3 times, and excluded four times or more. Secondly, a model with age at first conviction as dependant variable and whether the individual had ever attended a PRU as the independent variable was fitted. Ever having attended a PRU was a categorical variable with three levels - excluded and attended a PRU, excluded but did not attend a PRU, and never excluded. The third model tested whether Z-Scores on the KASS were associated with age at first

conviction. We finally tested whether Z-Scores on the KASS were correlated with school exclusions using a Spearman's rho correlation.

*Table 1:* Sample Description

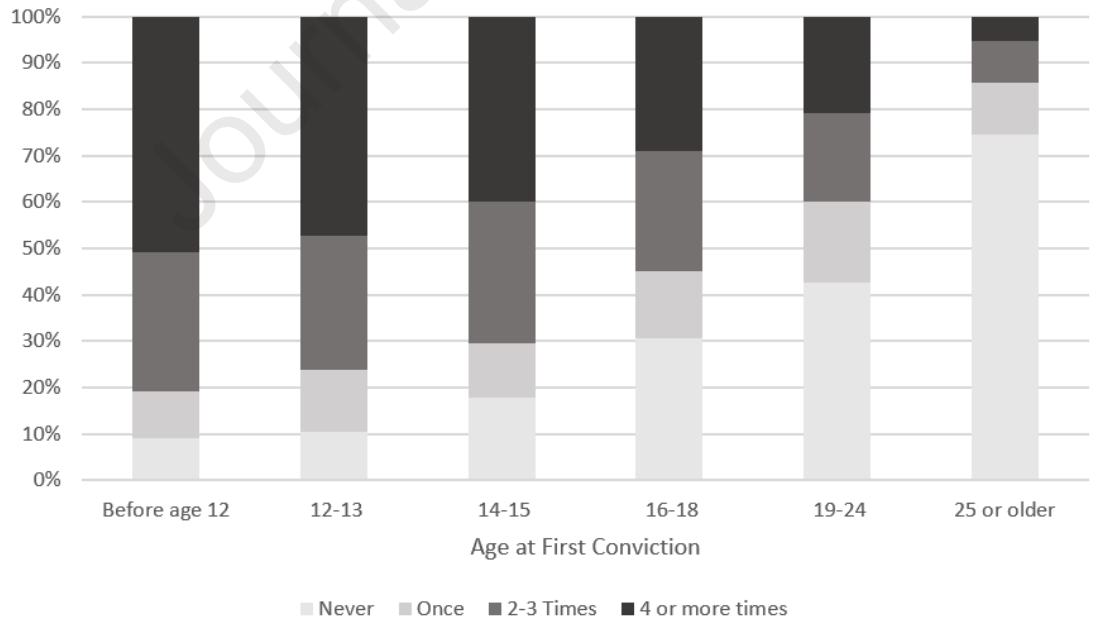
| Sample Description (n=3035) | | Mean or % (n =) | Standard Deviation |
|---|---|---|---|
| Number of School Exclusions | Never excluded from school | 35.1% (n = 1065) | |
| | Excluded from school once | 13.5% (n = 409) | |
| | Excluded from school 2 or 3 times | 22.7% (n = 689) | |
| | Excluded from school more than 4 times | 28.7% (n = 872) | |
| Ever referred to a PRU | Yes | 29.0% (n = 880) | |
| | No | 71.0% (n = 2155) | |
| Age of first conviction | Before the age of 12 | 7.5% (n = 227) | |
| | 12 - 13 | 12.8% (n = 389) | |
| | 14 - 15 | 17.5% (n = 530) | |
| | 16 – 18 | 23.2% (n = 703) | |
| | 19 – 24 | 19.5% (n = 591) | |
| | 25 and older | 19.6% (n = 595) | |
| KASS Score | | M = 36 | 6.0 |
| Current Age | Range = 18 – 82 years | M = 32, | 11.3 |
| Ethnicity[1] | White British | 84.4% (n = 2563) | |
| | Black or Black British | 5.2% (n = 159) | |
| | Asian or Asian British | 3.2% (n = 98) | |
| | Other | 7.1% (n = 215) | |
| Self-Identified Gender [2] | Male | 99.8% (n = 3031) | |
| | Female | 0.2% (n = 4) | |

[1]The sample was majority White British, and other ethnic groups were captured inconsistently. Therefore we created a binary variable to capture being White British or other, in order to control for ethnicity in our analysis.
[2]HMP Parc is a male institution, so prisoners who identified as female were transgender.
[3]Higher scores on the KASS indicate better functional skills.

## 3. Results

**Model 1: Age of first conviction predicted by number of school exclusions.** 64.9% of our sample had ever been excluded from school. Model 1 found that those who were excluded from school once were convicted for the first time 3 years younger on average than those who had never been excluded (table 2). Those who were excluded 2-3 times were first convicted 5 years younger on average, and those who were excluded 4 or more times were first convicted 6 years younger on average than those who were never excluded from school (controlling for current age, being White British, and z-scores on the KASS). Figure 1 illustrates the percentage of prisoners who were excluded from school never, once, 2-3 times, or 4+ times in each category of age at first conviction. This figure indicates that those who had been excluded from school multiple times were younger on average when first convicted.

*Figure 1:* Percentage of each age at first conviction category who were excluded from school never, once, 2-3 times, or 4+ times.



**Model 2: Age of first conviction predicted by ever attending a PRU.** Model 2 found that individuals who had attended a PRU were 6 years younger when first convicted than those who had never been excluded (controlling for current age, being White British, and z-scores on the KASS). Individuals who attended a PRU were also 2 years younger when first convicted than those who had been excluded but never attended a PRU.

**Model 3: Age of first conviction predicted by KASS Score.** Model 3 found that a standard deviation decrease in KASS score was associated with being 0.5 years younger at first conviction, when controlling for current age and being White British.

**Correlation: KASS Score and school exclusion.** A Spearman's correlation found that Individuals who scored lower than average on the KASS (where lower scores indicate poorer functional skills) were more likely to also report having been excluded from school ($r = -0.149$, $p < .001$).

*Table 2:* Results of three regression models to predict age of first conviction from school exclusion, PRU, and neurodisability.

| | | | |
|---|---|---|---|
| **Model 1:** Age at first conviction predicted by number of school exclusions, controlling for KASS score, being White British, and current age. | | | |
| | **Co-efficient** | **Std. Error** | **P =** |
| Excluded once[1] | -3.3 | 0.3 | <.001 |
| Excluded 2 or 3 times | -5.2 | 0.3 | |
| Excluded 4 or more times | -5.8 | 0.3 | |
| (Current age) | 0.1 | <0.1 | <.001 |
| (White British) | -0.9 | 0.3 | <.001 |
| (KASS Z-score[2]) | 0.3 | 0.1 | .004 |
| **Model 2:** Age at first conviction predicted by being excluded but not attending a PRU, and being excluded and attending a PRU (controlling for KASS score, being White British, and current age). | | | |
| | **Co-efficient** | **Std. Error** | **P =** |
| Excluded but did not attend a PRU[1] | -4.4 | 0.2 | <.001 |
| Excluded and attended a PRU | -6.1 | 0.3 | |
| (Current age) | 0.1 | <0.1 | <.001 |
| (White British) | -1.2 | 0.3 | <.001 |
| (KASS Z-score) | 0.4 | 0.1 | <.001 |
| **Model 3:** Age at first conviction predicted by neurodisability (scores on the KASS, where lower scores indicate more neurodisability), controlling for being White British and current age. | | | |
| | **Co-efficient** | **Std. Error** | **P =** |
| KASS Z-Score | 0.5 | 0.1 | <.001 |
| (Current age) | 0.2 | <0.1 | <.001 |
| (White British) | -1.4 | 0.3 | <.001 |

*Note:* Variables in brackets are control variables

[1]Never excluded was the reference category for this analysis

[2]Higher scores on the KASS indicate better functional skills

## 4. Discussion

Our findings indicate that being excluded from school is associated with being younger at first conviction. 65% of adult male prisoners had been excluded from school at least once. We found an additive effect of multiple school exclusions. Those who had been excluded from school once were first convicted on average 3 years earlier than those who

had never been excluded. Those who were excluded 2-3 times were first convicted 5 years younger, and those who were excluded 4 or more times were convicted 6 years younger on average than those who were never excluded from school (when controlling for current age, being White British, and neurodisability). These findings relate to Mowen & Brent's (2016) findings that multiple school exclusions increase odds of arrest and build a picture of school exclusion as a risk factor both for arrest and being younger at first conviction.

Individuals who had attended a PRU were 6 years younger on average when first convicted than those who had never been excluded (controlling for current age, being White British, and neurodisability). Individuals who attended a PRU were also 2 years younger when first convicted on average than those who had been excluded but never attended a PRU. This is important, as PRUs could therefore be a key target for intervention to prevent the potential 'school to prison pipeline'. Implementing screening at the point of referral to PRU could allow for the identification of neurodisabilities, and the provision of specialist support.

Additionally, having poorer functional skills indicative of neurodisability was associated with being younger at first conviction. A standard deviation decrease in scores on the KASS functional skills screener was associated with being 0.5 years younger at first conviction. One potential explanatory mechanism for this could be through school exclusion, as prisoners who scored poorly on the functional skills screener were more likely to have been excluded from school, but this warrants further investigation in data where temporal order can be established.

These correlational findings have tentative implications for interventions to prevent justice system contact at a young age, and indicate some support for interventions and policy changes to keep children in mainstream school wherever possible. Currently, targeted interventions to reduce rates of school exclusion have mixed efficacy. One systematic review and meta-analysis found school-based interventions were effective in the short-term, with some intervention types (such as skills training for teachers, and counselling/mental health services) showing more promising stable effects (Valdebenito et al., 2019). Another meta-analysis examining interventions to reduce school exclusion and subsequent arrest found that interventions significantly reduced exclusion and arrest in high school populations, but not in elementary school populations, and that the quality of

intervention and consistency of implementation significantly impacted whether the intervention reduced school exclusions (Mielke & Farrington, 2021).

Understanding the underlying reasons for behaviours seen in school especially for those who are 'at risk' of exclusion is essential otherwise intervention may be not appropriate and not targeted for children with neurodisabilities. The need for this increases after one period of exclusion. Improving efficacy of interventions to reduce school exclusions could have benefits to reduce the human and economic cost of crime, and to improve life chances for young people at risk of criminalisation. This may require in some cases, where children have a complex set of challenges, the need to create a 'team around the child' approach where families are engaged as well as education. In addition, it is possible that early convictions increase children's vulnerability to later school exclusions upon re-integration into the community. Effective re-engagement with education should be explored as a possible mechanism to prevent children becoming entrenched in the justice system.

**Limitations**

This study is impacted by several limitations, pertaining to the administrative and self-report nature of the data. Causal conclusions cannot be made because the data are observational. There is a likelihood that unmeasured confounds (family, school, neighbourhood, and individual characteristics) could explain the observed associations. We did not capture age at each school exclusion, school dropout regardless of exclusion, or whether each exclusion was fixed-term or permanent. As a result, it is likely that some exclusions occurred after an individual's first conviction. Controlling for these additional education variables in future studies would help to disentangle causal factors. Longitudinal cohort studies should aim to capture this in future, in order to ascribe temporal order to school exclusion and justice system contact and understand whether age at first exclusion impacts age at first justice system contact. Our findings indicate a potential threshold effect, where being excluded 2-3 times and 4+ times were associated with earlier first convictions than being excluded once. This relationship should be explored in future research with more granular data – capturing age of first conviction and number of school exclusions as continuous variables would allow for more inference around the impact of one or more exclusions.

Additionally, there is potential that individuals may have misremembered or incorrectly reported the information. Whilst the Do-IT Profiler is highly accessible by design, there is no guarantee of attention or engagement with the questions. We are also unable to provide normative data for the KASS measure, which would help to set these findings in the context of functional ability in the general population. Both school exclusion and contact with the criminal justice system are highly racialised outcomes. Children from Black Caribbean, Gypsy and Roma, and Irish Traveller backgrounds are excluded from school at disproportionately high rates (Timpson, 2019), and are also criminalised at disproportionately higher rates (YJB, 2021; The Traveller Movement, 2022). The data available did not distinguish these ethnic groups to enable us to examine whether outcomes were poorer for some ethnic groups, so this is an important recommendation for future research. Finally, sex differences may exist in trajectories into the criminal justice system. Our sample was from a male prison, so findings may not necessarily be applicable to females, as there is evidence factors influencing trajectories from school exclusion to justice system contact differ by sex (Sanders et al., 2018; Bäckman, 2017). Future research should look to replicate our findings in a female sample to understand sex differences.

### 4.1 Conclusion

Being excluded from school is associated with contact with the criminal justice system at a younger age, and this association appears additive with multiple exclusions . Referral to a PRU is associated with additional risk. This is problematic, as those who commit their first offences in childhood are more likely to reoffend. Children with neurodisability are also criminalised at a younger age, and school exclusion could offer a potential explanatory mechanism for this. With corroboration from longitudinal studies, keeping children in mainstream school could be a key intervention strategy to improve life outcomes for children at risk of school exclusion. In addition, prioritising re-engagement with education to prevent school exclusion following early convictions could be beneficial to preventing children becoming entrenched in the justice system. Part of this involves improving screening for neurodisabilities, and provision for children with SEN within mainstream schools. This requires teachers to have a greater understanding that behaviours that may lead to exclusion may have range of causes. Improved understanding, and the potential for early more targeted intervention, could contribute to the prevention of the net

criminalisation of children with neurodisability. If future longitudinal research corroborates our findings, policies relating to school discipline should move away from exclusion as a punishment as a priority. Punitive school and justice environments are detrimental to children's life course trajectories.

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***Key Highlights:***

- Multiple school exclusions are additively associated with earlier conviction
- Poor functional skills indicative of neurodisability are associated with being convicted younger
- Prisoners who had attended a Pupil Referral Unit were first convicted an average of 6 years younger than those who were never excluded
- Poor functional skills were correlated with school exclusion

**Declaration of interests**

☐ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☒The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Amanda Kirby is CEO and Founder of Do-IT Solutions. Do-IT Solutions developed the Do-IT profiler. Do-IT Solutions anticipate no direct or indirect financial gain from the publication of these findings. The other authors have no conflicts of interest to declare.