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# Young men in prison with Neurodevelopmental Disorders:

Missed, misdiagnosed and misinterpreted

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#### Introduction

It has long been recognised that young people are at increased risk of committing crime relative to adults<sup>1</sup>. Supporting these young people in prison is also complicated, as they are potentially more vulnerable than adults in the Justice sector<sup>2</sup>.

A desire to understand this population further has led to growing interest in the presence of Neurodevelopmental Disorders (NDDs) and, in the UK, the related term Learning Difficulties and Disabilites (LDDs). NDDs/LDDs have been seen as a potential marker of vulnerability<sup>3</sup>. NDDs are a group of common conditions that, following DSM-5 criteria<sup>4</sup>, include Attention-Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), Developmental Coordination Disorder (DCD, also known as Dyspraxia). Developmental Language Disorder (DLD), Dyscalculia, Dyslexia, Intellectual Disability (ID) and Tic Disorders. There is also growing interest in related adversity, for example head injury (which may result in Traumatic Brain Injury (TBI))<sup>5</sup> and Adverse Childhood Experiences (ACEs), which share many symptoms with NDDs<sup>6</sup>.

The literature indicates that young people who offend frequently have NDDs, TBI and/or trauma histories but few enter prison with diagnoses. NDDs and TBI may be commonly missed or misdiagnosed. Even when a young person has a diagnosis it may not accurately portray their *complete* profile of functional difficulties. The nature and pattern of difficulties is important, as this may alter the intervention approach. Alongside lack of awareness among prison staff, NDDs may result in increased vulnerability, risk of victimisation by other prisoners, reduced access to educational and vocational programmes and reduced potential for referral for further assessment. Those, ironically, who have experienced the most adversity may be the ones who miss out most on support.

#### A common vulnerability

The diagnosed prevalence of NDDs among children and young people in the UK ranges from between one in 200 to one in 50 for ADHD to between one in 50 and nearly one in 15 for Dyslexia<sup>7</sup>. Much higher prevalence rates are found within populations of vulnerable young people. For example, UK studies report ADHD rates ranging from one in ten among all young people in Liverpool Youth Offending Services<sup>8</sup> to three-quarters of those serving custodial sentences for four or more offences in a regional secure training centre<sup>9</sup>.

9. J Rayner, Tom P Kelly, and F Graham, "Mental Health, Personality and Cognitive Problems in Persistent Adolescent Offenders Require Long-Term Solutions: A Pilot Study," *Journal of Forensic Psychiatry and Psychology 16*, no. 2 (2005): 248–262.

Jeffery T Ulmer and Darrell Steffensmeier, "The Age and Crime Relationship: Social Variation, Social Explanations," in *The Nurture Versus Biosocial Debate in Criminology: On the Origins of Criminal Behavior and Criminality*, ed. Kevin M Beaver, J C Barnes, and Brian B Boutwell (London, UK: SAGE Publications Ltd., 2014), 377–396.

<sup>2.</sup> M Liddle et al., Trauma and Young Offenders – a Review of the Research and Practice Literature (London, UK, 2016).

<sup>3.</sup> Nathan Hughes et al., Nobody Made the Connection: The Prevalence of Neurodisability in Young People Who Offend (London, UK,

<sup>2012),</sup> https://yjlc.uk/wp-content/uploads/2015/03/Neurodisability\_Report\_FINAL\_UPDATED\_\_01\_11\_12.pdf.

<sup>4.</sup> APA, Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (Washington, DC: American Psychiatric Publishing, 2013).

<sup>5.</sup> Hughes et al., Nobody Made the Connection: The Prevalence of Neurodisability in Young People Who Offend.

Talin Babikian et al., "Chronic Aspects of Pediatric Traumatic Brain Injury: Review of the Literature," *Journal of Neurotrauma* 32, no. 23 (2015): 1849–1860; H K Chang et al., "Traumatic Brain Injury in Early Childhood and Risk of Attention-Deficit/Hyperactivity Disorder and Autism Spectrum Disorder: A Nationwide Longitudinal Study," Journal of Clinical Psychiatry 79, no. 6 (2018); Ling-Yu Yang et al., "Association of Traumatic Brain Injury in Childhood and Attention-Deficit/Hyperactivity Disorder: A Population-Based Study," *Pediatric Research* 80, no. 3 (2016): 356–362; Bessel A Van Der Kolk, "Developmental Trauma Disorder: A New Rational Diagnosis for Children with Complex Trauma Histories," *Psychiatric Annals* 35, no. 5 (2005): 401–408.

<sup>7.</sup> Mary Ann Megan Cleaton and Amanda Kirby, "Why Do We Find It so Hard to Calculate the Burden of Neurodevelopmental Disorders?," *Journal of Childhood & Developmental Disorders 4*, no. 3 (2018): 1–20.

Cath Lewis and Alex Scott-Samuel, Health Needs Assessment of Young Offenders in the Youth Justice System on Merseyside (Liverpool, UK, 2013).

#### Not just Neurodevelopmental Disorders

NDDs rarely exist in isolation: they commonly cooccur both with each other and with various physical and mental health conditions<sup>10</sup>. These include conditions such as TBI and ACEs .

TBI is known to be highly prevalent among young offender populations, with rates ranging from one in six to nearly three in four in one review<sup>11</sup>. Many young people in prison will have experienced multiple ACEs<sup>12</sup>. These may include abandonment, abuse and other trauma. This may be a common source of emotional, behavioural and psychological dysregulation, which can be conceptualised as Developmental Trauma Disorder<sup>13</sup>.

#### Needs are often missed and/or misdiagnosed

Prison systems and staff may assume that those who have NDDs will arrive diagnosed, be able to articulate their difficulties and ask for appropriate help. In fact, this is rarely the case. Many young people entering the Justice System may not have any formal diagnoses (or, alternatively, may have diagnoses for some but not *all* of the challenges they experience). Additionally, diagnoses in a prison context may often be based on 'behaviour' or a psychological framework, such Conduct Disorder or Borderline Personality Disorder, rather than considering NDDs and/or history of TBI or ACEs.

There are many reasons why a young person may have been missed or misdiagnosed prior to

entering prison. Parental engagement with health and educational services may have been limited, resulting in no access to screening or assessment processes<sup>14</sup>. Additionally, many young offenders have missed much of their education, for example through school exclusion, and some will have moved around the system (being a Looked After Child and/or Young Person (LACYP))<sup>15</sup>.

Misdiagnosis is also a considerable issue affecting individuals with NDDs. For example, ADHD<sup>16</sup>, ASD<sup>17</sup>, DLD<sup>18</sup> and other NDDs are frequently misdiagnosed as 'bad behaviour'. In other cases, NDDs may be misdiagnosed as another condition<sup>19</sup>. Confusion may also occur when history of head injury is not considered, as TBI can result in 'secondary' ADHD as well as symptoms that mimic ASD and ID<sup>20</sup>. Some children may appear to 'recover' from their TBI(s), as the behavioural impact may not become apparent until adolescence<sup>21</sup>. In these cases, symptoms are infrequently correctly attributed to the TBI.

### Unidentified support needs may lead to potential misrepresentation

The impact of having one or more NDDs, with or without TBI, may render individuals more vulnerable to offending, being coerced/manipulated into offending and/or impulsively making a confession. For example, it is recognised that individuals with ASD are less risk-aware and less socially protected, even compared with individuals with Down's

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- 12. M D Felitti et al., "Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults: The Adverse Childhood Experiences (ACE) Study," *American journal of preventive medicine* 14, no. 4 (1998): 245–258, http://www.sciencedirect.com/science/article/pii/S0749379798000178.
- 13. Van Der Kolk, "Developmental Trauma Disorder: A New Rational Diagnosis for Children with Complex Trauma Histories."
- 14. Alaa M Hamed, Aaron J Kauer, and Hanna E Stevens, "Why the Diagnosis of Attention Deficit Hyperactivity Disorder Matters," Frontiers in Psychiatry 6 (2015): 1–10; Duncan E Astle and Joe Bathelt, "Remapping the Cognitive and Neural Profiles of Children Who Struggle at School," Developmental Science 22 (2019): e12747.
- 15. Oak Foundation, Falling through the Gaps: Fragmented and Underfunded Systems Are Failing Care Leavers Who Serve Prison Sentences, in Custody and in the Community (London, UK, 2019); Jessica Jacobson et al., Punishing Disadvantage: A Profile of Children in Custody (London, UK, 2010).

16. Mary Horton-Salway, "Repertoires of ADHD in UK Newspaper Media," Health 15, no. 5 (2011): 533–549.

- 17. Kenny Midence and Meena O'Neill, "The Experience of Parents in the Diagnosis of Autism," Autism 3, no. 3 (1999): 273–285.
- 18. Kate Ripley and Nicola Yuill, "Patterns of Language Impairment and Behaviour in Boys Excluded from School," *British Journal of Educational Psychology* 75, no. Pt 1 (2005): 37–50.
- 19. (e.g. Aggarwal and Angus, 2015)
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- 21. James Tonks et al., "Is Damage to the Pre-Frontal Cortex Dormant until Adolescence, or Difficult to Detect? Looking for Keys That Unlock Executive Functions in Children in the Wrong Place," *Medical Hypotheses* 108 (2017): 24–30.

Syndrome<sup>22</sup>. Children with ASD are significantly more socially vulnerable than typically developing children<sup>23</sup> and at increased risk of being manipulated or exploited by others to commit crime<sup>24</sup>.

Young people with ADHD are more likely to commit reactive and/or opportunistic offences and to be apprehended, and less likely to appreciate the seriousness of their actions<sup>25</sup>. Young people with ADHD may not trust their memory during police interrogation, resulting in responses that appear evasive<sup>26</sup>. They may be more motivated to comply with requests and avoid conflict, resulting in greater rates of false confession<sup>27</sup>.

## Supporting young people in prison — meeting their needs

Individuals with NDDs and TBI are at increased risk of *cumulative* adversity including: increased risk of mental health difficulties and substance use disorders<sup>28</sup>, increased risk of victimisation within prison<sup>29</sup> and also poor educational<sup>30</sup> and employment outcomes<sup>31</sup>. Thus, NDDs and TBI may impact on young people's ability to engage with and succeed at educational and vocational programmes within prison that aim to reduce reoffending<sup>32</sup>.

#### Aims of the study

The main aim of the study was to explore the rate and pattern of self-reported difficulties in four key functional areas (relating to attention and concentration; social and communication; coordination and organisation; and literacy and numeracy) among 188 young men in Her Majesty's Prison (HMP) and Young Offenders' Institute (YOI) Polmont, Scotland, UK. Secondarily, it considered whether there was an association between these functional difficulties, self-reported head injury and previous formal NDD diagnoses.

#### **Materials and Methods**

#### Sampling and procedure

Young men in HMP and YOI Polmont were recruited over a ten-month period (November 2017 to August 2018) using a convenience sampling method as part of routine screening for LDDs undertaken by SPS. All young men were invited to the Learning Centre as part of their induction. All young men who attended the Learning Centre and volunteered to be screened within the study period were recruited.

All participants included in the study provided two levels of informed consent. The process was agreed by SPS and is now routine: firstly, consent was obtained to screen for functional difficulties associated with NDDs; secondly, consent was obtained for anonymised data to be used by Do-IT Solutions Ltd. for research purposes. Written permission for Do-IT Solutions Ltd. to perform secondary analyses and publish anonymised data was also provided by SPS.

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- 28. Cleaton and Kirby, "Why Do We Find It so Hard to Calculate the Burden of Neurodevelopmental Disorders?"
- 29. Nancy Loucks and Jenny Talbot, No One Knows: Identifying and Supporting Prisoners with Learning Difficulties and Learning Disabilities: The Views of Prison Staff (Scotland) (London, UK, 2007).
- 30. Cleaton and Kirby, "Why Do We Find It so Hard to Calculate the Burden of Neurodevelopmental Disorders?"; Mary R Prasad, Paul R Swank, and Linda Ewing-Cobbs, "Long-Term School Outcomes of Children and Adolescents with Traumatic Brain Injury," *Journal of Head Trauma Rehabilitation* 32, no. 1 (2017): E24–E32; Amir Sariaslan et al., "Long-Term Outcomes Associated with Traumatic Brain Injury in Childhood and Adolescence: A Nationwide Swedish Cohort Study of a Wide Range of Medical and Social Outcomes," *PLoS Medicine* 13, no. 8 (2016): e1002103; Amery Treble-Barna et al., "Long-Term Classroom Functioning and Its Association With Neuropsychological and Academic Performance Following Traumatic Brain Injury During Early Childhood," Neuropsychology 31, no. 5 (2017): 486–498.
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#### **Do-IT Profiler**

Do-IT Profiler is a person-centred, computerbased, modular screening and assessment system<sup>33</sup>. It has been used extensively in the Justice sector<sup>34</sup>. It has built-in accessibility features including: voiced question and answer options; alternative function keys to limit the need to use a mouse; a zoom-in function to increase font size; and the ability to change the text and background colour to aid readability. Completion does not require users to type or enter text.

On initial log-in, an introductory video is viewed. The user then completes questionnaires at their own pace, taking breaks as necessary. The average total completion time for the questionnaires is 25-40 minutes. Each response is recorded and automatically collated. Within SPS, a staff member was always present during completion. Staff were trained in the use and content of the Do-IT Profiler and could assist users, for example by pressing keys, if required. Once completed, practical guidance dependent on the user's specific responses is generated for both the user and staff.

The following information was collected using this system.

#### Personal information

Participants answered demographic questions regarding gender, ethnicity, first language and marital status. They also indicated whether they had previously been given a formal diagnosis of NDDs (options: 'Asperger's Syndrome', 'Autism Spectrum Disorder (ASD)', 'Down's Syndrome', 'Other Learning Disability', 'Attention-Deficit/Hyperactivity Disorder (ADHD/ADD)', 'Dyslexia', 'Dyspraxia/Developmental Coordination Disorder (DCD)', 'Dyscalculia' or 'Other Learning Difficulty') and whether they had a history of head injury. History of head injury was assessed using the following questions: 'Do you currently have, or have you had a significant injury to your head or face?' (options: 'Yes' or 'No') and 'If yes, were you knocked unconscious as a result of this injury?' (options: 'Yes' or 'No').

Questionnaires were designed to reduce participant and organisational burden and be able to

be practically administered in a prison setting. This meant more detailed questions about head injury, selfharm and suicidality could not be included. Additionally, questions were only included if there were clear, practical guidelines or supports in place for participants. Thus, questions regarding childhood abuse, historical and current domestic violence victimisation and other ACEs were not included, even though these are important factors relating to youth offending<sup>35</sup>. Ethical concerns regarding the capacity of prison staff to adequately support participants following potential disclosure were an additional reason for non-inclusion.

#### Screening for functional difficulties

This screening questionnaire has been developed and validated in UK general and prison populations<sup>36</sup>. The questions are partially derived from existing standardised tools, including the Adult Developmental Coordination Disorder Checklist<sup>37</sup> and the Adult Dyslexia Checklist<sup>38</sup>.

Participants answered a 60-item questionnaire, divided equally into four key functional areas relating to: attention and concentration; social and communication; coordination and organisation; and literacy and numeracy <sup>39</sup>. Participants rated the 60 items (e.g. 'I am easily distracted by noises or activity around me') on a four-point Likert scale ('Very like me', 'A bit like me', 'Not really like me' and 'Not like me at all'). A total score was derived per section by summing the score for each question in the section, resulting in a maximum score of 60 per section with a higher score representing fewer difficulties.

In order to identify the most vulnerable group, that is those with the greatest number of selfreported difficulties, the sample was sub-divided into three groups per section. Those scoring in the ≤25th percentile within a section were considered to have the most severe functional difficulties, those scoring between the 26th-50th percentile were considered to have some functional difficulties and those scoring >50th percentile were considered to have reported the least functional difficulties (i.e. any difficulties reported were not severe enough to functionally affect individuals' day-to-day lives). All

<sup>33.</sup> Amanda Kirby and Ian Smythe, "Do-IT>," last modified 2019, accessed March 4, 2019, https://doitprofiler.com/.

Amanda Kirby and Lisette Saunders, "A Case Study of an Embedded System in Prison to Support Individuals with Learning Difficulties and Disabilities in the Criminal Justice System," *Journal of Intellectual Disabilities and Offending Behavior* 6, no. 2 (2015): 122–124.
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<sup>36.</sup> Ibid.

<sup>37.</sup> Amanda Kirby et al., "The Development and Standardization of the Adult Developmental Co-Ordination Disorders/Dyspraxia Checklist (ADC)," Research in Developmental Disabilities 31, no. 1 (2010): 131–139.

<sup>38.</sup> Ian Smythe and John Everatt, "Checklist for Adults with Dyslexia," in *The Dyslexia Handbook*, ed. Mike Johnson and Lindsay Peer (London, UK: British Dyslexia Association, 2002).

<sup>39.</sup> J Smith and Amanda Kirby, "Identification and Implication of Specific Learning Difficulties in a Prison Population," *Forensic Update* 84 (2006): 15–19.

percentile cut-offs were derived from the sample, as suitable population norms were not available.

#### Results

#### Participants

Of the young men invited to participate, 188 completed both the personal details questionnaire and

the questionnaire screening for functional difficulties. The majority of these young men had never been married, were White and spoke English as a first language (Table 1). Of those who did not speak English as a first language, nearly all spoke Scots and/or Scottish Gaelic as a first language and the remaining one in ten spoke an 'other' language.

	No.	per cent
Ethnicity		
White	179	95.2
Mixed	2	1.1
Asian or Asian British	4	2.1
Black or Black British	1	0.5
Other	2	1.1
First language		
English	150	79.8
Scots and/or Scottish Gaelic	35	18.6
Irish and/or Ulster Scots	0	0.0
Welsh	0	0.0
Cornish	0	0.0
Other	3	1.6
Marital status		
Never married	152	80.9
Married	3	1.6
Civil partnership	20	10.6
Divorced	0	0.0
Separated	13	6.9
Widowed	0	0.0
Looked After Child and/or Young Person		
Yes	71	38.0
No	115	61.5
Not sure	1	0.5
Prefer not to say	1	0.5
Excluded from school		
Never	29	15.4
Once	18	9.6
Twice	18	9.6
3 or more times	122	64.9
Prefer not to say	1	0.5
Age left education		
12 years and under	10	5.3
13-14 years	41	21.8
15-16 years	108	57.4
17-18 years	23	12.2
19 years and over	6	3.2
General school attendance		
Excellent school attendance, absent for illness only	25	13.3
Occasionally missed school (absent <25 per cent of the time)	54	28.7
Regularly missed school (absent ~50 per cent of the time)	67	35.6
Hardly attended school (absent >75 per cent of the time)	38	20.2
Never attended school	4	2.1

#### Table 1: Demographic and educational information.

#### **Educational and care histories**

Nearly two-fifths of the young men reported a history of being 'in care' (i.e. LACYP) and many reported a history of educational disadvantage (Table 1). In particular, two-thirds reported having been excluded from school three or more times, more than four-fifths reported having left education at or before age 16 years and less than one-fifth reported that they were only absent from school for reasons of illness.

Four-fifths of those who had ever been LACYP had been excluded from school three or more times, but this was true of only half of those who had never been LACYP. Likewise, a greater proportion of those who had been excluded from school three or more times (Similarly, half of those who had been excluded from school three or more times had ever been LACYP, compared with a sixth of those who had never been excluded from school.

#### **Reported functional difficulties**

Just over half of the young men scored at or below the 25th percentile and thus reported having severe

Table 2: Pattern of self-reported functional difficulties.

functional difficulties in one or more of the following areas: attention and concentration; social and communication; coordination and organisation; and/or literacy and numeracy. A further quarter of them scored in the 26th-50th percentiles, and thus had some functional difficulties in one or more areas, and just under a fifth scored above the 50th percentile, and thus had the least functional difficulties in any area.

All possible combinations of screened functional difficulties were reported (Table 2). Among those who had reported functional difficulties, a fifth reported severe difficulties in one functional area, a fifth reported severe difficulties in two functional areas, 7 per cent reported severe difficulties in three functional areas and 8 per cent reported severe difficulties in all four of the key functional areas tested.

The most common combinations of severe functional difficulties were: co-occurring attention and concentration difficulties, social and communication difficulties, coordination and organisation difficulties and literacy and numeracy difficulties (8 per cent); and coordination and organisation difficulties only (7 per cent).

	No.	per cent
Least functional difficulties in any areas	34	18.1
Some functional difficulties in one or more areas	51	27.1
Severe functional difficulties in one area		
Attention and concentration difficulties	12	6.4
Social and communication difficulties	6	3.2
Coordination and organisation difficulties	13	6.9
Literacy and numeracy difficulties	12	6.4
Severe functional difficulties in two areas		
Attention and concentration + social and communication difficulties	6	3.2
Attention and concentration + coordination and organisation difficulties	5	2.7
Attention and concentration + literacy and numeracy difficulties	4	2.1
Social and communication + coordination and organisation difficulties	6	3.2
Social and communication + literacy and numeracy difficulties	6	3.2
Coordination and organisation + literacy and numeracy difficulties	4	2.1
Severe functional difficulties in three areas		
Attention and concentration + social and communication + coordination and organisation difficulties	5	2.7
Attention and concentration + social and communication + literacy and numeracy difficulties	2	1.1
Attention and concentration + coordination and organisation + literacy and numeracy difficulties	4	2.1
Social and communication + coordination and organisation + literacy and numeracy difficulties	3	1.6
Severe functional difficulties in four areas Attention and concentration + social and communication + coordination and organisation + literacy and numeracy	15	8.0

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# Previous Neurodevelopmental Disorder diagnoses

The presence of previous NDD diagnoses was investigated among those young men who reported having functional difficulties — full details of this are reported in Table 3.

Among the 54 young men who reported severe attention and concentration difficulties, just over onequarter had a previous diagnosis of ADHD or ADD. Similarly, of the 50 young men who reported severe literacy and numeracy difficulties, just over onequarter had a previous diagnosis of Dyslexia. However, only 6 per cent of those who reported severe social and communication difficulties had a previous diagnosis of ASD or Asperger's Syndrome and only 2 per cent of those who reported severe coordination and organisation difficulties had a previous diagnosis of DCD or Dyspraxia. Among those meeting the cut-off for severe social and communication difficulties or coordination and organisation difficulties, having other severe functional difficulties appeared to increase the likelihood of having received a diagnosis whereas the opposite was true for those who met the cut-off for severe attention and concentration difficulties or literacy and numeracy difficulties. Overall, there was evidence of a gap between reported symptoms and previous diagnosis, particularly for ASD and DCD diagnoses.

Table 3: Previous formal NDD	diagnoses among those r	eporting functional difficulties.

Severe functional difficulties detected with screening	No. ( per cent)		
	Previous diagnosis*	No previous diagnosis*	
Attention and concentration difficulties (all)	15 (27.8)	39 (72.2)	
Attention and concentration difficulties only	5 (41.7)	7 (58.3)	
Attention and concentration difficulties + other difficulties	10 (23.8)	32 (76.2)	
Social and communication difficulties (all)	3 (6.3)	45 (93.8)	
Social and communication difficulties only	0 (0.0)	6 (100.0)	
Social and communication difficulties + other difficulties	3 (7.1)	39 (92.9)	
Coordination and organisation difficulties (all)	1 (1.8)	54 (98.2)	
Coordination and organisation difficulties only	0 (0.0)	13 (100.0)	
Coordination and organisation difficulties + other difficulties	1 (2.4)	41 (97.6)	
Literacy and numeracy difficulties (all)	14 (28.0)	36 (72.0)	
Literacy and numeracy difficulties only	4 (33.3)	8 (66.7)	
Literacy and numeracy difficulties + other difficulties	10 (26.3)	28 (73.7)	

\* Comparisons were made against the following formal diagnoses: attention and concentration difficulties versus an ADHD or ADD diagnosis; social and communication difficulties versus an ASD or Asperger's Syndrome diagnosis; coordination and organisation difficulties versus a DCD or Dyspraxia diagnosis; and literacy and numeracy difficulties versus a Dyslexia diagnosis.

The presence of functional difficulties was investigated among those young men who reported having a previous NDD diagnosis — full details of this are reported in Table 4. Within the whole cohort, a sixth reported having a previous diagnosis of ADHD or ADD, 3 per cent reported having a previous diagnosis of ASD or Asperger's Syndrome, 1 per cent reported having a previous diagnosis of DCD or Dyspraxia and one in ten reported having a previous diagnosis of Dyslexia. However, many of these individuals did not report severe functional difficulties in associated areas. Among those reporting a previous diagnosis of ADHD, nearly half did not report severe attention and concentration difficulties. Likewise, among those reporting a previous diagnosis of ASD, half did not

report severe social and communication difficulties. Among those reporting a previous diagnosis of Dyslexia, a third did not report severe literacy and numeracy difficulties. Finally, of the two individuals reporting a previous diagnosis of DCD, one did not report severe coordination and organisation difficulties. The young men who reported having an NDD diagnosis did not report severe functional difficulties, but this may not mean they were misdiagnosed. Many of them scored within the 26th-50th percentile, rather than above the 50th percentile, and thus did report some difficulties in areas relevant to their formal diagnosis. This was particularly true of those who reported having a previous diagnosis of ADHD.

Table 4: Functional	difficulties among	those rep	orting a p	previous fo	rmal NDD	diagnosis.
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		No. ( per cent)			
Previously	N	Least			
diagnosed NDD	Severe functional difficulties associated with	Severe functional difficulties associated with	No severe functional difficulties, some difficultes in one or	functional difficulties associated	
	this NDD*	other NDD(s) only*	more areas	with any NDD	
ADHD/ADD	15 (53.6)	9 (32.1)	3 (10.7)	1 (3.6)	
ASD/Asperger's	3 (50.0)	2 (33.3)	1 (16.7)	0 (0.0)	
DCD/Dyspraxia	1 (50.0)	0 (0.0)	0 (0.0)	1 (50.0)	
Dyslexia	14 (66.7)	4 (19.0)	2 (9.8)	1 (4.8)	

\* Functional difficulties in the following areas were associated with the following formal diagnoses: attention and concentration difficulties with ADHD or ADD; social and communication difficulties with ASD or Asperger's Syndrome; coordination and organisation difficulties with DCD or Dyspraxia; and literacy and numeracy difficulties with Dyslexia.

#### History of head injury

Overall, one-fifth of young men reported experiencing head injury and just under one-sixth reported experiencing one or more head injuries with loss of consciousness (LOC). Head injuries with LOC are more likely to be severe and to be associated with ongoing symptoms such as poor memory or attention. The association between functional difficulties and head injury was investigated — this is shown in Figure 1.

Among the young men with the least functional difficulties in any of the four key areas, nearly one in ten had experienced at least one head injury with LOC. Among those with some functional difficulties in at least one area, one in ten had experienced at least one head injury with LOC. However, among those reporting severe functional difficulties, rates of head injury showed no clear relationship to the number of

functional areas affected. There were no significant differences in the rate of head injury with or without LOC between young men reporting the least functional difficulties (n = 34) and young men with severe functional difficulties in one or more areas (n = 103; p = 0.2978, two-tailed Barnard's Exact Test).

However, considerable variability was observed in the rate of head injury with LOC depending on the pattern of functional difficulties reported. For example, among young men with severe functional difficulties in one area, one-quarter of those with 'attention and concentration difficulties only' and one-third of those with 'social and communication difficulties only' reported having experienced at least one head injury with LOC. However, less than one in ten of those with 'coordination and organisation difficulties only' and those with 'literacy and numeracy difficulties only' reported having experienced this.



#### Figure 1: History of head injury among the sample of young men.

Key: LOC, loss of consciousness. Sample size (l-r): 34, 51, 43, 31, 14, 15.

#### Correlations between functional difficulties, diagnoses and past history

The associations between functional difficulties, NDD diagnoses and history of being LACYP, of at least one school exclusion and of having at least one head injury were investigated — these are shown in Table 5. Young people with a history of being LACYP were significantly more likely to have self-reported difficulties with literacy and numeracy whereas those with a history of school exclusion were significantly more likely to have been given a diagnosis of ADHD and Dyslexia. Those with a history of at least one head injury were also significantly more likely to have been given a diagnosis of ADHD or Dyslexia.

Table 5: Correlation between functional difficult	es, formal NDD diagnoses and past history
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	Odds ratio (95 per cent CI)			
	Ever LACYP	Excluded from school at least once	History of at least one head injury	
Attention and concentration				
Self-reported severe difficulties	1.77 (0.92, 3.40)	0.87 (0.37, 2.17)	1.68 (0.79, 3.50)	
ADHD diagnosis	1.49 (0.65, 3.39)	5.03 (1.00, 122.79)	4.23 (1.78, 10.02)	
Social and communication				
Self-reported severe difficulties	1.44 (0.73, 2.82)	0.50 (0.22, 1.18)	1.56 (0.71, 3.32)	
ASD diagnosis	1.64 (0.28, 9.80)	0.34 (0.06, 2.85)	1.95 (0.23, 11.04)	
Coordination and organisation				
Self-reported severe difficulties	0.98 (0.50, 1.88)	1.34 (0.55, 3.63)	1.05 (0.47, 2.23)	
DCD diagnosis	1.25 (0.48, 3.15)	3.55 (0.69, 87.36)	1.20 (0.36, 3.34)	
Literacy and numeracy				
Self-reported severe difficulties	3.06 (1.57, 6.07)	0.93 (0.39, 2.42)	0.64 (0.25, 1.45)	
Dyslexia diagnosis	1.05 (0.47, 2.23)	3.06 (1.57, 6.07)	3.73 (0.09, 147.65)	

Italics: p < 0.05 (mid-p exact test).

#### Limitations of the study

This cross-sectional study employed a convenience sampling method and took place within a single prison. The majority of young men who participated were White, unmarried and spoke English as a first language. No information was available regarding young men who declined to participate, so it is unknown whether they differed from sampled young men. Ninety-six percent of the Scottish prison population is White<sup>40</sup>, so the sample was representative of the general prison population in this regard.

The sample was a convenience sample. Only individuals who both attended the Learning Centre and volunteered to take part in the study were sampled. Additionally, individuals who withdrew consent or stopped answering questions part-way through the study were excluded. It may be reasonable to assume that individuals with functional difficulties might be less likely to attend the Learning Centre, less likely to want to participate, more likely to withdraw consent and more likely to fail to complete the questionnaires. This may have affected the representativeness of the sample and, thus, the conclusions. In particular, the reported prevalence of functional difficulties may be lower in the study sample than the actual prevalence of functional difficulties in the overall prison population.

The screening questionnaire relied on self-report of symptoms associated with NDDs in order to assess their functioning in a practical, time-efficient and consistent manner. Self-report has been used as a reliable means of assessment among adults with ADHD, for example, although they, like adults and adolescents with TBI, tend to under-report the severity of their symptoms<sup>41</sup>. Among adults, self-report questionnaires have reasonably high sensitivity at predicting receipt of an ASD diagnosis<sup>42</sup>.

Questions were only included in questionnaires if they were necessary, if they could be practically administered in a prison setting and if there were clear, practical guidelines or supports in place for participants. This placed limitations on the detail we could collect regarding head injury, self-harm and suicidality and prevented the inclusion of any questions about domestic violence victimisation and other ACEs.

<sup>40.</sup> Georgina Sturge, UK Prison Population Statistics (London, UK, 2018).

<sup>41.</sup> J J Sandra Kooij et al., "Reliability, Validity, and Utility of Instruments for Self-Report and Informant Report Concerning Symptoms of ADHD in Adult Patients," *Journal of Attention Disorders* 11, no. 4 (2008): 445–458, http://journals.sagepub.com.proxyub.rug.nl/doi/pdf/10.1177/1087054707299367; J M Leathem, L J Murphy, and R A Flett, "Self- and Informant-Ratings on the Patient Competency Rating Scale in Patients with Traumatic Brain Injury," *Journal of Clinical and Experimental Neuropsychology* 20, no. 5 (1998): 694–705; K R Wilson, J Donders, and L Nguyen, "Self and Parent Ratings of Executive Functioning after Adolescent Traumatic Brain Injury," *Rehabilitation Psychology* 56, no. 2 (2011): 100–106.

<sup>42.</sup> Bram B Sizoo et al., "Predictive Validity of Self-Report Questionnaires in the Assessment of Autism Spectrum Disorders in Adults," Autism 19, no. 7 (2015): 842–849.

Exploring these topics would be a valuable subject of future work.

All analyses were based on within-cohort comparisons, as appropriate, socioeconomicallymatched general population data was not available. Thus, the young men categorised as having the 'least severe' functional difficulties may still have had comparatively severe difficulties relative to the general population.

#### Discussion

This study presents the first study looking broadly at self-reported NDD symptoms in young men in a prison setting. It demonstrates that young men in

prison are a highly heterogenous population with great variability in presentation and pattern of challenges and functional impairments. Notably, all possible combinations of severe functional difficulties were observed and no more than 8 per cent of the young men reported the same combination of severe functional difficulties. This is important to note as it suggests a need for individualised formulations and support.

#### Potential missing diagnoses

Although just over half of the cohort reported having severe functional difficulties in one or

more areas and a further one-quarter reported some functional difficulties, comparatively few had formal NDD diagnoses. In particular, only 2 per cent of those with severe coordination and organisation difficulties had a DCD diagnosis and only 8 per cent of those with severe social and communication difficulties had an ASD diagnosis. Although some of these cases may represent difficulties as a result of other reasons, for example Cerebral Palsy, DLD, TBI or ACEs, it is possible that many represent missed NDD diagnoses.

...many young people in prison, including a history of being LACYP and/or excluded from school which may result in a lack of engagement with services that provide diagnoses

This lack of diagnoses may be related to the chaotic lives experienced by many young people in prison, including a history of being LACYP and/or excluded from school which may result in a lack of engagement with services that provide diagnoses<sup>43</sup>. Our preliminary analysis comparing these groups does not entirely support this theory as, for example, those with a history of school exclusion were more likely to have an ADHD or Dyslexia diagnosis than those who were not. It is possible that this may be a function of our sampling strategy, which only sampled young men who attended the prison's Learning Centre. Alternatively, it may be that these young people are obtaining diagnoses, but only doing so comparatively late — for example after having experienced adversity such as repeated school

exclusion over several years when diagnoses maybe of less use to improve outcomes. A third possibility is that these young people are obtaining diagnoses but not getting any support following their diagnoses, resulting in the diagnoses а self-fulfilling becomina prophecy rather than a way to improve outcomes. A recent study of children with diagnosed ADHD who received pharmacotherapy supports this. It found that UK children were most likely of all European children to have 'a great deal of difficulty' getting referred to a specialist and getting a diagnosis, had the longest referral waits and

were least likely to have ever received behavioural therapy  $^{\!\!\!^{44}}\!\!\!$  .

The marked levels of apparent underdiagnosis in this cohort may also be related to the well-documented 'postcode lottery' that affects provision of diagnostic services in the UK<sup>45</sup>. The diagnosis an individual receives remains, in many cases, determined by the services provided by their local healthcare board<sup>46</sup>, the knowledge and biases of their parents and of gatekeepers such as teachers and GPs<sup>47</sup>, the particular

<sup>43.</sup> Jacobson et al., Punishing Disadvantage: A Profile of Children in Custody; Lewis and Scott-Samuel, Health Needs Assessment of Young Offenders in the Youth Justice System on Merseyside; Oak Foundation, Falling through the Gaps: Fragmented and Underfunded Systems Are Failing Care Leavers Who Serve Prison Sentences, in Custody and in the Community.

<sup>44.</sup> Moshe Fridman et al., "Access to Diagnosis, Treatment, and Supportive Services among Pharmacotherapy-Treated Children/ Adolescents with ADHD in Europe: Data from the Caregiver Perspective on Pediatric ADHD Survey," *Neuropsychiatric Disease and Treatment* 13 (2017): 947–958.

<sup>45.</sup> Norman Lamb, The Autism Diagnosis Crisis: Research from Rt Hon Norman Lamb MP and the All Part Parliamentary Group on Autism Uncovers Stark Regional Variation and Long Waits for Autism Diagnosis (London, UK, 2018).

<sup>46.</sup> Calum Ross, "NHS Grampian Accused of 'shocking' Discrimination against Adults with ADHD," The Press and Journal, last modified 2018, accessed January 28, 2019, https://www.pressandjournal.co.uk/fp/news/aberdeen/1512913/nhs-grampian-accused-of-shockingdiscrimination-against-adults-with-adhd/.

<sup>47.</sup> Mami Miyasaka, Shogo Kajimura, and Michio Nomura, "Biases in Understanding Attention Deficit Hyperactivity Disorder and Autism Spectrum Disorder in Japan," *Frontiers in Psychology* 9, no. FEB (2018): 1–13.

specialists that are seen48 and the ability of the individual and/or their parents to access services<sup>49</sup>. In particular, some less well-known conditions, such as DCD and DLD, often fail to be considered and assessments for these may be particularly difficult to access<sup>50</sup>.

It is also possible that the apparent underdiagnosis in this cohort may, in some cases, be the result of diagnostic thresholds. Some individuals, despite having functional difficulties in a number of areas, do not reach the diagnostic threshold for any or all of the particular conditions associated with these difficulties. It is guite common, for example, for individuals with ADHD or DLD to have what is described as 'Autistic tendencies' - that is sub-threshold ASD<sup>51</sup>. However, diagnostic

result thresholds can in inequitable provision of support and services. The cumulative pattern of challenges experienced by someone with symptoms of multiple NDDs at a sub-threshold level may be functionally more impairing than the challenges experienced by someone who meets diagnostic criteria for, and has symptoms of, a single condition only. However, without a diagnosis, individuals with sub-threshold NDDs are rarely deemed eligible for educational or medical support. Other contributing factors such as TBI, abuse experiences and

family disadvantage are rarely considered when diagnosing. From clinical experience we note that 'Autistic features', for example, are commonly reported in young people with TBI histories, yet 'recovering from TBI' is not recognisable as a primary diagnosis.

Thus, the current medical and categorical approach to assessing and providing support risks only identifying and supporting those with comparatively few difficulties. This leaves those with multiple, complex difficulties, greater impairment and more negative psychosocial factors unidentified and unsupported.

It is quite common, for example, for individuals with ADHD or DLD to have what is described as 'Autistic tendencies' - that is subthreshold ASD.

#### Potential misdiagnoses and diagnostic instability

This study shows that many young people in prison who have previous NDD diagnoses do not report having functional difficulties associated with that diagnosis. However, the majority of these individuals do report other functional difficulties. This raises the question of whether people are being incorrectly diagnosed — for example, are young men with ASD being misdiagnosed as having ADHD? However, it is also possible that these diagnoses were correct when they were given but that individuals' difficulties have waxed and waned over time, particularly during emerging adulthood. Although the majority of children with NDDs have lifelong symptoms, a significant minority of individuals (typically

> around 15-25 per cent, excepting in ASD and ID) do not continue to meet diagnostic criteria in adulthood<sup>52</sup>.

Another possibile explanation is that adolescents and young adults with NDDs can present differently to children, resulting in them meeting diagnostic criteria in childhood but appearing not to later. This may occur due to improvement or maturation of skills, receipt of in childhood, interventions current medication status and/or greater ability to adapt or avoid situations and specific tasks they find challenging. However, these

individuals may still exhibit difficulties when learning new skills, for example when an individual with DCD learns to drive<sup>53</sup>.

A third possibility is that individuals with NDDs may have significant challenges but may not recognise this themselves. For example, adults with ADHD and adolescents and adults with TBI tend to under-report the severity of their symptoms<sup>54</sup>. Their diagnosis may stem from parent, teacher and/or assessor observation and assessment in childhood. This may not necessarily correspond with self-assessment of their difficulties,

Astle and Bathelt, "Remapping the Cognitive and Neural Profiles of Children Who Struggle at School." 48.

<sup>49.</sup> Mickey Keenan et al., "The Experiences of Parents During Diagnosis and Forward Planning for Children with Autism Spectrum Disorder," Journal of Applied Research in Intellectual Disabilities 23 (2010): 390–397.

Cheryl Missiuna et al., "Mysteries and Mazes: Parents' Experiences of Children with Developmental Coordination Disorder.," Canadian 50.

*journal of occupational therapy* 73, no. 1 (2006): 7–17, http://www.ncbi.nlm.nih.gov/pubmed/16570837.
Gina Conti-Ramsden, Zoë Simkin, and Nicola Botting, "The Prevalence of Autistic Spectrum Disorders in Adolescents with a History of Specific Language Impairment (SLI)," Journal of Child Psychology and Psychiatry and Allied Disciplines 47, no. 6 (2006): 621–628; Jessica Leigh Green et al., "Autism Spectrum Disorder Symptoms in Children with ADHD: A Community-Based Study," Research in Developmental Disabilities 47 (2015): 175–184.

<sup>52.</sup> Cleaton and Kirby, "Why Do We Find It so Hard to Calculate the Burden of Neurodevelopmental Disorders?"

<sup>53.</sup> Amanda Kirby, Lisa Edwards, and David Sugden, "Emerging Adulthood in Developmental Co-Ordination Disorder: Parent and Young Adult Perspectives," Research in Developmental Disabilities 32, no. 4 (2011): 1351–1360.

<sup>54.</sup> Kooij et al., "Reliability, Validity, and Utility of Instruments for Self-Report and Informant Report Concerning Symptoms of ADHD in Adult Patients"; Leathem, Murphy, and Flett, "Self- and Informant-Ratings on the Patient Competency Rating Scale in Patients with Traumatic Brain Injury"; Wilson, Donders, and Nguyen, "Self and Parent Ratings of Executive Functioning after Adolescent Traumatic Brain Injury."

either in childhood or later. This emphasises the importance of collecting both self- and observer-reports of symptoms whenever possible and considering both when assessing support needs.

#### Potential misdiagnosis and psychosocial factors

The pattern of adversity reported in this study also demonstrates how incorrect assumptions may be made if a complete history is not taken. Of the young men with severe functional difficulties, nearly oneguarter reported experiencing at least one head injury and one-sixth reported experiencing at least one head injury with LOC. It is possible, therefore, that for some difficulties are acquired rather their than developmental. In particular, TBI may be associated with 'secondary' ADHD and may result in symptoms that mimic ASD and ID<sup>55</sup>. ACEs may also result in similar symptoms<sup>56</sup>.

The finding that head injury was not significantly associated with severe functional difficulties in this cohort is unexpected. However, this may reflect the fact that head injury in young men is associated with particular combinations of severe functional difficulties — a possibility which is suggested by the data, but which could not be explored statistically due to the small numbers of young men reporting each combination of severe functional difficulties.

# What are the potential consequences of a missed or misdiagnosis?

Missing or misdiagnosing NDDs has serious potential ramifications, particularly within the prison context. In particular, there is evidence that NDDs may make some individuals more vulnerable in a variety of ways — for example, to mental health difficulties, poor academic achievement and unemployment.

People with a variety of NDDs are at increased risk of various types of victimisation. Children and adults with ADHD<sup>57</sup>, ASD<sup>58</sup>, Dyslexia<sup>59</sup> and ID<sup>60</sup> are at increased risk of being victims of abuse and/or neglect. This association with victimisation may extend to offending. For example, people with ASD are at greater risk of being manipulated or exploited by others in order to commit crimes<sup>61</sup>. County Lines drug supply chains are often associated with 'cuckooing', a process whereby drug dealers take over and trade from a local person's home. This cuckooing often exploits people with ID<sup>62</sup>.

NDDs may be associated with other types of vulnerability that affect offending, particularly when unrecognised and thus untreated. For example, individuals with ADHD are particularly vulnerable to illicit substance misuse, possibly as an attempt at self-medication<sup>63</sup>. However, this may result in substance use disorders, with consequences for offending and recidivism<sup>64</sup>. In this situation, treating the underlying ADHD is associated with reduced substance misuse

- 55. Babikian et al., "Chronic Aspects of Pediatric Traumatic Brain Injury: Review of the Literature"; Chang et al., "Traumatic Brain Injury in Early Childhood and Risk of Attention-Deficit/Hyperactivity Disorder and Autism Spectrum Disorder: A Nationwide Longitudinal Study"; Compton et al., "Prevalence of Traumatic Brain Injury in Children with Attention-Deficit/Hyperactivity Disorder: A Cross-Sectional Study"; Keenan, Hall, and Marshall, "Early Head Injury and Attention-Deficit/Hyperactivity Disorder: Retrospective Cohort Study"; Yang et al., "Association of Traumatic Brain Injury in Childhood and Attention-Deficit/Hyperactivity Disorder: A Population-Based Study"; Max et al., "Predictors of Attention-Deficit/Hyperactivity Disorder Within 6 Months After Pediatric Traumatic Brain Injury"; Max et al., "Predictors of Secondary Attention-Deficit / Hyperactivity Disorder in Children and Adolescents 6 to 24 Months After Traumatic Brain Injury."
- 56. Van Der Kolk, "Developmental Trauma Disorder: A New Rational Diagnosis for Children with Complex Trauma Histories."
- 57. Adi Stern et al., "Associations between Abuse/Neglect and ADHD from Childhood to Young Adulthood: A Prospective Nationally-Representative Twin Study," Child Abuse and Neglect 81, no. January (2018): 274–285; Emel Sari Gokten et al., "Effects of Attention-Deficit/Hyperactivity Disorder on *Child Abuse and Neglect*," *Child Abuse and Neglect* 62 (2016): 1–9, http://dx.doi.org/10.1016/j.chiabu.2016.10.007.
- 58. S M Brown-Lavoie, M A Viecili, and J A Weiss, "Sexual Knowledge and Victimization in Adults with Autism Spectrum Disorders," Journal of Autism and Developmental Disorders 44, no. 9 (2014): 2185–2196; David S Mandell et al., "The Prevalence and Correlates of Abuse among Children with Autism Served in Comprehensive Community-Based Mental Health Settings," Child Abuse and Neglect 29, no. 12 (2005): 1359–1372.
- 59. Esme Fuller-Thomson and S R Hooper, "The Association between Childhood Physical Abuse and Dyslexia: Findings from a Population-Based Study," *Journal of Interpersonal Violence* 30, no. 9 (2015): 1583–1592.

60. Gary Byrne, "Prevalence and Psychological Sequelae of Sexual Abuse among Individuals with an Intellectual Disability: A Review of the Recent Literature," *Journal of Intellectual Disabilities* 22, no. 3 (2018): 294–310, http://journals.sagepub.com/doi/10.1177/1744629517698844; Willi Horner-Johnson and Charles E Drum, "Prevalence of Maltreatment of People with Intellectual Disabilities: A Review of Recently Published Research," *Mental Retardation and Developmental Disabilities Research Reviews* 12 (2006): 57–69.

61. Payne, "Introducing Social Vulnerability and Compliance as Factors for Understanding Offending in Autism Spectrum Disorder."

- 62. Jack Spicer, Leah Moyle, and Ross Coomber, "The Variable and Evolving Nature of 'Cuckooing' as a Form of Criminal Exploitation in Street Level Drug Markets," *Trends in Organized Crime* (2019).
- 63. Gisli H Gudjonsson et al., "An Epidemiological Study of ADHD Symptoms among Young Persons and the Relationship with Cigarette Smoking, Alcohol Consumption and Illicit Drug Use," *Journal of Child Psychology and Psychiatry and Allied Disciplines* 53, no. 3 (2012): 304–312.
- 64. Carlos Knecht et al., "Attention-Deficit Hyperactivity Disorder (ADHD), Substance Use Disorders, and Criminality: A Difficult Problem with Complex Solutions," International Journal of Adolescent Medicine and Health 27, no. 2 (2015): 163–175.

relapses, improved housing status and increased employment rates<sup>65</sup>. These factors are also all associated with reduced recidivism<sup>66</sup>. It is possible that a similar approach may benefit individuals with TBI, as head injury is associated with increased risk of both developing and relapsing to substance misuse<sup>67</sup>.

#### **Conclusions and recommendations**

In this study, the focus has been on Neurodevelopmental Disorders and Traumatic Brain Injury. However, expanding this approach and considering the interaction between multiple factors is likely to be key to equitable and effective service provision. A broader, biopsychosocial approach, rather than using a narrower, medical model, may be particularly important when working with vulnerable populations such as young people in prison, who have often experienced complex patterns of cumulative adversity. Once these factors are taken into consideration, it may be apparent that different formulations for support and intervention are required. For example, the optimal treatment of substance use disorders — a common problem among young people in prison — depends on whether the individual has cooccurring ADHD<sup>68</sup>. Identifying the neuropsychological components within an individual's difficulties is critical in order to understand how each component may influence a young person's presentation. In order to do this effectively and accurately, a broader and more holistic view is required, rather than the current system which separates LDDs, mental health and substance misuse and fails to consider either their interaction or additional factors.

The finding that such a high proportion of young men in prison report severe functional difficulties has implications for their management within the Justice Sector. As there are limited services and funding available, profiling and understanding patterns of cumulative adversity is essential. This will enable the right support to be targeted to those who are most vulnerable, resulting in the greatest impact on day-today functioning. Much discussion has focused on cause and effect, particularly the link to ACEs<sup>69</sup>. In reality, it is important to undertake a person-centred approach and consider the person holistically, including any potential NDDs, TBI, childhood factors and current factors. This type of approach may also save time and money in comparison to condition-specific approaches, which risk both duplicating work and missing potential support needs.

However, it is clear that screening and interventions in the Justice Sector must be combined with a whole-prison approach and greater awareness in schools and communities to maximise effectiveness. Early identification and timely, evidence-based support targeted to all functional difficulties experienced by a young person is essential to prevent cumulative adversity. In particular, there is a desperate need to comprehensively screen all LACYP and all children excluded from school, as these groups are both at increased risk of NDDs and TBI and at increased risk of offending. An integrated approach between community and forensic services is likely necessary. This will require greater in-reach of community Child and Adolescent Mental Health Services (CAMHS) into prisons to support the currently under-funded forensic CAMHS. Without these changes to both forensic and community practice, we risk leaving already vulnerable and marginalised young people at risk of further abuse, victimisation and exploitation, setting them up to fail in education, leaving them at increased risk of offending and letting them leave prison at high risk of further adversity and reoffending.

Berit Bihlar Muld et al., "Long-Term Outcomes of Pharmacologically Treated versus Non-Treated Adults with ADHD and Substance Use Disorder: A Naturalistic Study," *Journal of Substance Abuse Treatment* 51 (2015): 82–90, http://dx.doi.org/10.1016/j.jsat.2014.11.005.
 Kathryn Hopkins, *The Pre-Custody Employment, Training and Education Status of Newly Sentenced Prisoners: Results from the*

<sup>66.</sup> Kathryn Hopkins, The Pre-Custody Employment, Training and Education Status of Newly Sentenced Prisoners: Results from the Surveying Prisoner Crime Reduction (SPCR) Longitudinal Cohort Study of Prisoners (London, UK, 2012); Andrew O'Hagan and Rachel Hardwick, "Behind Bars: The Truth about Drugs in Prisons," Forensic Research & Criminology International Journal 5, no. 3 (2017): 00158; Kim Williams, Jennifer Poyser, and Kathryn Hopkins, Accommodation, Homelessness and Reoffending of Prisoners: Results from the Surveying Prisoner Crime Reduction (SPCR) Survey (London, UK, 2012).

<sup>67.</sup> Steven F Merkel et al., "Factors Affecting Increased Risk for Substance Use Disorders Following Traumatic Brain Injury: What Can We Learn from Animal Models," *Neuroscience and Biobehavioral Reviews* 77 (2017): 209–218; James M Bjork and Steven J Grant, "Does Traumatic Brain Injury Increase Risk for Substance Abuse?," *Journal of Neurotrauma* 26, no. 7 (2009): 1077–1082.

<sup>68.</sup> Sean X Luo and Frances R Levin, "Towards Precision Addiction Treatment: New Findings in Co-Morbid Substance Use and Attention-Deficit Hyperactivity Disorders," *Current Psychiatry Reports* 19, no. 3 (2017): 14.

<sup>69.</sup> Baglivio et al., "The Prevalence of Adverse Childhood Experiences (ACE) in the Lives of Juvenile Offenders."